

P9000 m-series
Volume 1
Customer Engineer Manual

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<p><u>Onofficiële update voor het CE manual.</u></p> <p>1 Dit zijn updates (z.o.z.) voor het CE manual door DEE CS0 SMA-SS geleverd om twee redenen:</p> <p>2 Hoofdstuk 3.13 is officieel vervallen. Dat is jammer want enkele mensen maakten hier toch wel gebruik van. om ons terwille te zijn is de laatste update wel gemaakt inclusief inhoudsopgave, doch wordt niet meer uitgegeven. Zorg er dus voor dat je die er niet uitgooit bij een volgende officiële update als je hem wilt behouden.</p> <p>Vriendelijke groeten John Eekman. SMA-SS</p> <table border="1"><tr><td colspan="2">Geautoriseerd door: R.M.Havekes </td><td>Datum: 14-8-92</td></tr><tr><td>Auteurs:</td><td>Uitgever:</td><td>Datum : 14-08-92</td></tr><tr><td>n.v.t.</td><td>Op1/Doc-CS</td><td>B1z. : 0.0-1</td></tr></table>			Geautoriseerd door: R.M.Havekes 		Datum: 14-8-92	Auteurs:	Uitgever:	Datum : 14-08-92	n.v.t.	Op1/Doc-CS	B1z. : 0.0-1
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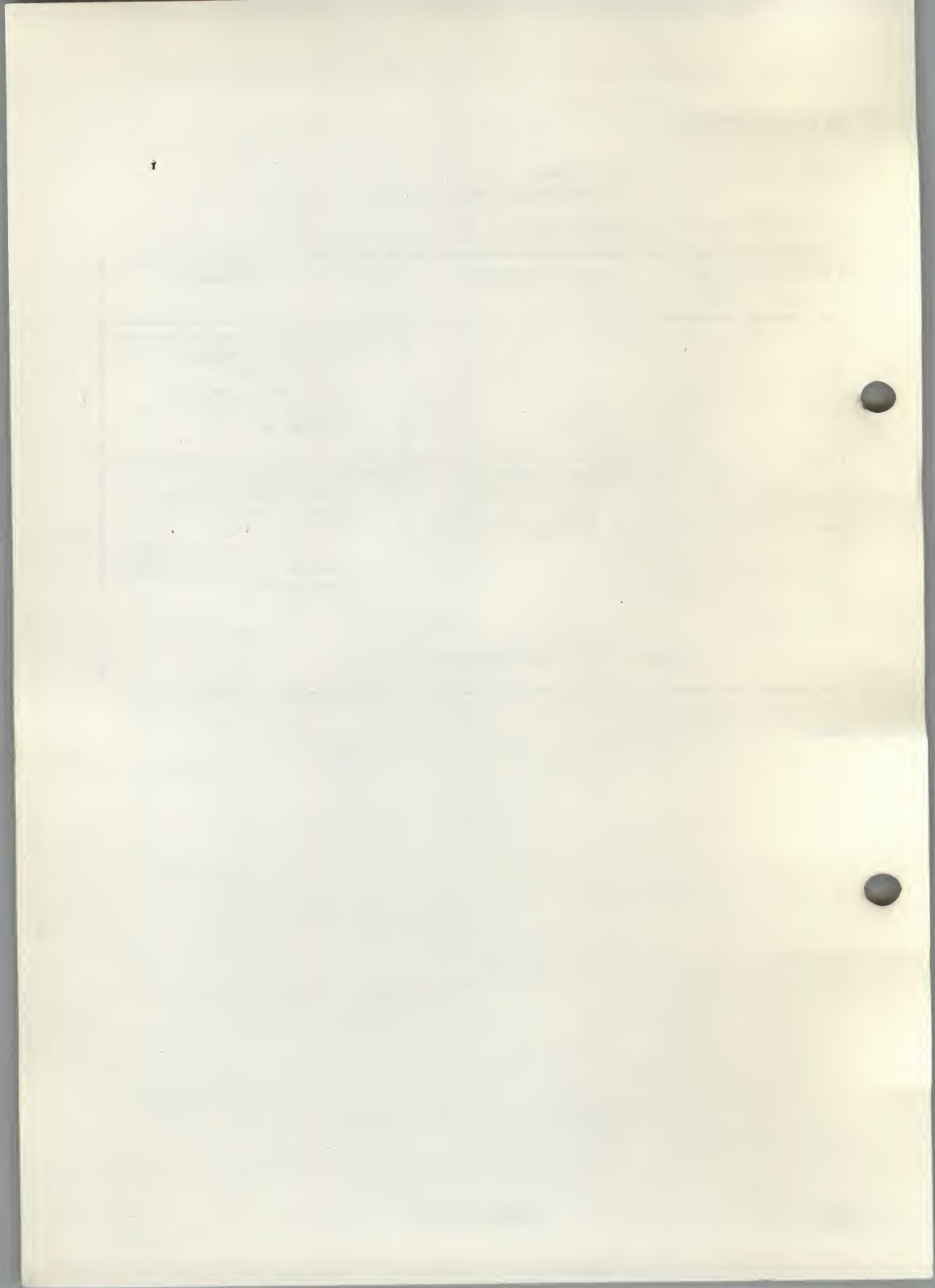
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1			All	9202	Completely revised version of the old P90X0 CE Manual 5122 991 35669 New system components, released up to Febr 1992 , are implemented
2	1	155 159	Title page, Status Record 1-3 thr. 1-8, 1-13/14, 1-17/18 1-21/22, 1-35/36 3-1 thr 3-3/4, 3-83/84, 3-89 thr. 3-92 9.10-3/4 10.7-1 thr 10.7-4 12.0-1/2, 12.5-3/4, 12.6-1 thr. 12.6-10 15.0-1/2, 15.1-3/4, 15.11-1 thr. 15.11-4 21.0-1/2, 21.1-1/2, 21.9-1 thr. 21.9-4	9209	Corrected some errors. Added section 3.13 Device relations, MVME328S-1/2, MVME376, VT420 Temporary updates to the CEM, made via SI P9070-155 and 159 are made official



PREFACE

This manual has been written in a format intended to provide a common structure throughout all Customer Engineer Manuals. This is of benefit as information of a certain type is now in a set location in any manual (for example disk drives will always be covered in chapter 18, if applicable to the product).

The system and the peripherals that it uses are covered by this manual. If there is no item for a category for which there is a chapter allocated, then the chapter will be omitted and its chapter number reserved for future use. The contents at the front of the manual lists the chapters. Sections and subsections contained in each chapter are listed at the beginning of the chapter.

There are three major divisions in the manual, their purpose is as follows:

- Chapters 1 - 7 System Units and information relating to the complete system(s) covered (Chapter 6 is intended for local information and will not be filled in by CSTO-Apeldoorn, chapter 7 is intended for personal notes of the user of this manual).
- 8 - 17 Power Supplies, device adapters and other controllers contained within the system units.
- 18 - 24 Devices and peripherals, both internal and external to the system units.

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MVME Number	MVME Module Description	
705A	Transition Board (Related to MVME333-2) (6 ch)	
705B	Transition Board (Related to MVME333X25) (3 ch)	
705-1	Transition Module (Related to 333X25) (3 ch)	
707A	Transition Board (Related to MVME131 and MVME132)	
710	Transition Board (Related to MVME332)	
712A	Transition Board (Serial Ports and Printer Port) (Related to MVME147/187)	
712B	Transition Board (Ethernet and SCSI Port) (Related to MVME147/187)	
712C	Transition Board (Thinnet trans. and SCSI Port) (Related to MVME147/187)	
712M	Transition Board (Related to MVME147)	
714M	Transition Board (Related to MVME141, MVME181, MVME188)	
715	Transition Board (Related to MVME335)	
716	Transition Board (Related to MVME134)	
717	Transition Board (Related to MVME327A)	
719	Transition Board with thinnet transceiver (Related to MVME374)	
751	Transition Board (Related to MVME336)	
831	First 653 Kb Diskette Drive (TEAC)	ECD
831XT	First 1.2 Mb Diskette Drive (TEAC)	
832	Second 653 Kb Diskette Drive	ECD
832XT	Second 1.2 Mb Diskette Drive	ECD
841	85(67) Mb Winchester Disk Drive (Micropolis 1325)	ECD
842	161 Mb ESDI Winchester Drive (CDC WREN III)	ECD
843	390 Mb ESDI Winchester Drive (CDC WREN V)	ECD
851	60 Mb Streaming Tape Drive and Controller (5945L-2)	ECD
851Q	60 Mb QIC-2 Streaming Tape Drive (VIPER)	ECD
852	60 Mb SCSI Streaming Tape Drive (2060S VIPER)	ECD
852Q	60 Mb QIC-2 Streaming Tape Drive (2060L VIPER)	ECD
853	150 Mb SCSI Streaming Tape Drive (2150S VIPER)	
853Q	150 Mb QIC-2 Streaming Tape Drive (2150L VIPER)	
854	525 Mb SCSI Streaming Tape Drive	
855	155 Mb SCSI Streaming Tape Drive (TEAC 2ST) 3½"	
856	2.3 Mb SCSI Tape Drive EXA 8200	
862	48 Mb SCSI Winchester Disk Drive (SEAGATE ST157) 3½"	ECD
863	104 Mb SCSI Winchester Disk Drive (CDC SWIFT 94351-126) 3½"	ECD
863	104 Mb SCSI Winchester Disk Drive (CDC SWIFT 94351-126) 3½"	ECD
863A	104 Mb SCSI Winchester Disk Drive (Fujitsu M2613ESA) 3½"	ECD
864	172 Mb SCSI Winchester Disk Drive (CDC SWIFT 94351-200) 3½"	ECD
864A	172 Mb SCSI Winchester Disk Drive (Fujitsu M2614ESA) 3½"	
865	330 Mb SCSI Winchester Disk Drive (Fujitsu) 3½"	
866	520 Mb SCSI Winchester Disk Drive (Fujitsu) 3½"	
872	48 Mb SCSI Winchester Disk Drive (SEAGATE ST157N) 5¼" Front Panel	ECD
873	85 Mb SCSI Winchester Drive (SEAGATE ST296N)	ECD
874	150 Mb SCSI Winchester Drive (CDC WREN III)	ECD
875	300 Mb SCSI Winchester Disk Drive (CDC WREN IV)	ECD
876	600 Mb SCSI Winchester Disk Drive (CDC WREN V)	ECD
877	1.2 Gb SCSI Winchester Disk Drive (Seagate WREN VII)	

MVME Number	MVME Module Description	
881	1.2 Mb SCSI FDD (Related to MVME147)	ECD
881A	1.2 Mb SCSI FDD half height (Related to MVME147/187/328)	
883	1.2 Mb SA-450 FDD (Related to MVME327A)	
884	1.2 Mb-4Mb SCSI FDD (TEAC FD-235JS) Related to MVME147 3½"	
888	600 Mb SCSI CD-ROM (Toshiba)	
952-DT	220V 3-Slot Desk Top Enclosure (P9030)	
953-1	110V 6 Slot Floor Enclosure P9050	ECD
953-2	220V 6-Slot Floor Enclosure P9050	ECD
954-1	110V 6-Slot Floor Enclosure (P9050 Enhanced Cabinet)	
954-2	220V 6-Slot Floor Enclosure (P9050 Enhanced Cabinet)	
955-1	110V 12-Slot Floor Enclosure P9070	
955-2	220V 12-Slot Floor Enclosure P9070	
985-1	110V 20-slot Floor Enclosure P9090	
985-2	220V 20-slot Floor Enclosure P9090	
DS985PIO	Mass Storage Subsystem	
P3544-001	M890/M891 Cipher 9-Track Tape Drive 1600 bpi	
P3549-001	M990 Cipher 9-Track Tape Drive 6250 bpi	ECD
P3549-101	M995-S Cipher 9-Track Tape Drive 6250 bpi	
P3540-702	SCSI Adapter for P3544-001 / P3549-001	
P3540-801	Special Cable for SCSI Connection	

Notes: ECD stands for End of Commercial Delivery
SMD stands for Surface Mounted Devices

1.1 CONFIGURATIONS

1.1.1 MVME Product Names

MVME Number	MVME Module Description		
131DOF	68020	16.7 MHz Processor with Mem. Managment Board	ECD
131XT	68020	16.7 MHz Processor with Mem. Man. Board and Ext. Cache	ECD
132DOF	68020	16.7 MHz Processor with Mem. Managment Unit	ECD
132XT	68020	16.7 MHz Processor with Mem. Man. Unit and Ext. Cache	ECD
134	68020	16.7 MHz Processor with 4Mb and FP Co-Processor	ECD
141-1	68030	25 MHz Processor with Cache	ECD
141-2	68030	33 MHz Processor with Cache	ECD
141-3	68030	50 MHz Processor with Cache	ECD
147	68030	20 MHz Processor with 4Mb memory	ECD
147A	68030	20 MHz Processor with 8Mb memory	ECD
147-1	68030	25 MHz Processor with 4Mb memory	ECD
147A-1	68030	25 MHz Processor with 8Mb memory	ECD
147S-1	68030	25 MHz Processor with 4Mb memory	SMD ECD
147SA-1	68030	25 MHz Processor with 8Mb memory	SMD
147SA-2	68030	32 MHz Processor with 8Mb memory	SMD Not released
147SB-1	68030	25 MHz Processor with 16Mb memory	SMD
147SC-1	68030	25 MHz Processor with 32Mb memory	SMD
147SC-2	68030	32 MHz Processor with 32Mb memory	SMD Not released
147SRF	68030	16 MHz Processor with 4Mb memory	SMD ECD
181-1	One MC88100, two MC88200, 20MHz, 8Mb memory		Not released
187	One MC88100, two MC88200, 25MHz, 4Mb memory		Not released
187A	One MC88100, two MC88200, 25MHz, 8Mb memory		Not released
187B	One MC88100, two MC88200, 25MHz, 16Mb memory		
187C	One MC88100, two MC88200, 25MHz, 32Mb memory		
188A-1P128-x	Single RISC Processor with 128Kb cache. The x indicates the mem capacity		
188A-2P128-x	Dual RISC Processor with 128Kb cache. The x indicates the mem capacity		
188A-4P128-x	Quad RISC Processor with 128Kb cache. The x indicates the mem capacity		
188SP-5-16	One MC88100, four MC88200 (64Kb cache), 25MHz, 16Mb memory		
188SP-5-32	One MC88100, four MC88200 (64Kb cache), 25MHz, 32Mb memory		
188SP-5-64	One MC88100, four MC88200 (64Kb cache), 25MHz, 64Mb memory		
188SP-5-128	One MC88100, four MC88200 (64Kb cache), 25MHz, 128Mb memory		
188DP-2-16	Two MC88100, eight MC88200 (128Kb cache), 25MHz, 16Mb memory		
188DP-2-64	Two MC88100, eight MC88200 (128Kb cache), 25MHz, 64Mb memory		
188DP-2-128	Two MC88100, eight MC88200 (128Kb cache), 25MHz, 128Mb memory		
188DP-2-256	Two MC88100, eight MC88200 (128Kb cache), 25MHz, 256Mb memory		
188DP-5-32	Two MC88100, four MC88200 (64Kb cache), 25MHz, 32Mb memory		
188QP-2-64	Four MC88100, eight MC88200 (128Kb cache), 25MHz, 64Mb memory		
	Not released		

MVME Number	MVME Module Description	
204-2F	2Mb Dual-Ported Parity RAM Module /FAST	ECD
205	4Mb ECC RAM Module	ECD
224-1	4Mb Dual Ported Memory Module	Not released
224-2	8Mb Dual Ported Memory Module	ECD
224A-1	4Mb Dual Ported Memory Module	Not released
224A-2	8Mb Dual Ported Memory Module	ECD
224A-3	16Mb Dual Ported Memory Module	ECD
224A-4	32Mb Dual Ported Memory Module	ECD
236-2	8Mb ECC RAM Module	Not released
236-3	16Mb ECC RAM Module	Not released
257	4Mb DRAM Module for the MVME187	Not released
257A	8Mb DRAM Module for the MVME187	Not released
257B	16Mb DRAM Module for the MVME187	
257C	32Mb DRAM Module for the MVME187	
258	4Mb add on DRAM Module for the MVME187	Not released
258A	8Mb add on DRAM Module for the MVME187	Not released
258B	16Mb add on DRAM Module for the MVME187	
258C	32Mb add on DRAM Module for the MVME187	
288-16	16Mb DRAM Module, related to MVME188	
288-64	64Mb DRAM Module, related to MVME188	
288A-16	16Mb DRAM Module, related to MVME188A	
288A-64	64Mb DRAM Module, related to MVME188A	
320A	Winchester Floppy Controller	ECD
320B	Winchester Floppy Controller	ECD
323-1	ESDI Winchester Disk Controller	ECD
323-2	ESDI Winchester Disk Controller	ECD
327A	High Performance SCSI Controller	ECD
328-1	Single channel SCSI Controller	
328-2	Dual channel SCSI Controller	
330A	Office LAN Controller XNS protocol	ECD
330B	TCP/IP RFS Controller	ECD
332	8 Port Serial Controller	ECD
332PA1	1 Port Printer Interface Adapter	
332PA2	2 Port Printer Interface Adapter	
332XT	High Performance Serial I/O Controller	
333-2	Intelligent WAN Controller	
333X.25	X.25 Controller	
335	4 Terminal/1 Printer I/O Controller	
336	Delta Link Controller (Connected to SYS 336 M16, SERVER)	
338	Terminal I/O Subsystem	
350	QIC-2 Streamer Tape Controller	
355	9-Track Tape Controller	ECD
374	Ethernet LAN Controller (Multi Protocol)	
376	High perf. Ethernet LAN Controller (Multi Protocol)	

1.1.2 Model Overview P9030

MODEL P9030-	SYSTEM NAME	PROCESSOR				MEMORY			DISK DRIVES						TAPE DRIVES				REMARKS
		1) MVME	MPU	SPEED MHz	TRANS. BOARD	MVME	MAX.		MANU FACT.	TYPE	I INTER FACE	CAP	MAX SUP.	MVME	MANU FACT.	TYPE	I INTER FACE	CAP	
301	3204NY043	147SRF- 1	68030	16	712A	224-2	2	862	SEA- GATE	5T157 N/M	SCSI	48MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
302	3204NY045	147SRF- 1	68030	16	712A	224-2	2	862	SEA- GATE	5T157 N/M	SCSI	48MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD
303	3204NY103R	147SRF- 1	68030	16	712A	224-2	2	863	CDC	94351- 126	SCSI	104MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
305	3204NY105R	147SRF- 1	68030	16	712A	224-2	2	863	CDC	94351- 126	SCSI	104MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD
311	3204NY103	147S-1	68030	25	712A/B	224-2	2	863	CDC	94351- 126	SCSI	104MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
312	3204NY105	147S-1	68030	25	712A/B	224-2	2	863	CDC	94351- 126	SCSI	104MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD
321	M3200B15 133A3	147SA- 1	68030	25	712A/B	224-2	2	863	CDC	94351- 126	SCSI	104MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
322	M3200B15 135A3	147SA- 1	68030	25	712A/B	224-2	2	863	CDC	94351- 126	SCSI	104MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD
331	M3200B15 183A3	147SA- 1	68030	25	712A/B	224-2	2	864	CDC	94351- 200	SCSI	172MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
332	M3200B15 185A3	147SA- 1	68030	25	712A/B	224-2	2	864	CDC	94351- 200	SCSI	172MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD
341	M3200C15 133A3	147SB- 1	68030	25	712A/B			863	SEA- GATE	94351- 126	SCSI	104MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
342	M3200C15 135A3	147SB- 1	68030	25	712A/B			863	SEA- GATE	94351- 126	SCSI	104MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD
343	M3200C15 183A3	147SB- 1	68030	25	712A/B			864	SEA- GATE	94351- 200	SCSI	172MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
344	M3200C15 185A3	147SB- 1	68030	25	712A/B			864	SEA- GATE	94351- 200	SCSI	172MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD
354	M3200D15 185A3	147SC- 1	68030	25	712A/B			864	SEA- GATE	94351- 200	SCSI	172MB	1	853	ARCHIVE	VIPER	SCSI	150MB	ECD

NOTES 1) Memory on the MVME147: MVME147SRF and MVME147S-1 4Mbyte
MVME147SA-1 8Mbyte
MVME147SB-1 16Mbyte
MVME147SC-1 32Mbyte

ECD stands for End of Commercial Delivery

Model Overview P9035

MODEL P9035-	1) SYSTEM NAME	PROCESSOR				MEMORY		DISK DRIVES					TAPE DRIVES					REMARKS	
		2) MVME	SPEED MHz	3) TRANS. BOARD		MVME	MAX.	MVME	MANU FACT.	TYPE	INTER FACE	CAP	MAX SUP.	MVME	MANU FACT.	TYPE	INTER FACE		CAP
R200	M8220A3	187B	88100	25	712A/B/C	257B	1	865 866	Fujitsu Fujitsu	M2622SA M2624SA	SCSI SCSI	330MB 520MB	2 2	853 853	Archive Archive	VIPER VIPER	SCSI SCSI	150MB 150MB	
R200	M8220A3	187C	88100	25	712A/B/C	257C	1	865 866	Fujitsu Fujitsu	M2622SA M2624SA	SCSI SCSI	330MB 520MB	2 2	853 853	Archive Archive	VIPER VIPER	SCSI SCSI	150MB 150MB	

NOTES

- 1) The basic System does not include the memory.
- 2) The MVME187B RISC Single Board Computer is equipped with a 16Mb MVME257B memory mezzanine board
The MVME187C RISC Single Board Computer is equipped with a 32Mb MVME257C memory mezzanine board
Both MVME187 RISC boards can be upgraded with one MVME258B (16Mb) or one MVME258C (32Mb) memory board.
- 3) The transition module MVME712C (double wide) does have a thinnet transceiver, and an external SCSI port.
This MVME712C can be elected in place of the MVME712B

1.1.3 MVME Modules Supported in P9030

MODEL P9030-	MEMORY												DATA COMM. AND LAN CONTROLLERS												TAPE DRIVE INCL. CU and SCSI DEVICES				SCSI DISK DRIVES				FDD SCSI		ENCLO- SURE
			1)								2)	2)	3)	4)			5)			6)	6)				6)										
	204	205	224 -2	224 A-3	330 A	330 B	332 PA1	332 PA2	332 XT	333 -2	333 X.25	335	336	374	851	852	853	855	856	862	863	864	881	883	884	952									
301			2	2			x	x	2	2	1	1	1	1				1		2	2				1	1									
302			2	2			x	x	2	2	1	1	1	1	1		1			2						1									
303			2	2			x	x	2	2	1	1	1	1						2	2				1	1									
305			2	2			x	x	2	2	1	1	1	1			1				2					1									
311			2	2			x	x	2	2	1	1	1	1	1			1			2	2			1	1									
312			2	2			x	x	2	2	1	1	1	1	1		1				2					1									
321			2	2			x	x	2	2	1	1	1	1	1						2	2				1									
322			2	2			x	x	2	2	1	1	1	1	1			1				2	2			1									
331			2	2			x	x	2	2	1	1	1	1	1			1					2			1									
332			2	2			x	x	2	2	1	1	1	1	1											1									
341			2	2			x	x	2	2	1	1	1	1	1				1						1	1									
342			2	2			x	x	2	2	1	1	1	1	1			1				1				1									
343			2	2			x	x	2	2	1	1	1	1	1							2				1									
344			2	2			x	x	2	2	1	1	1	1	1			1				1				1									
354			2	2			x	x	2	2	1	1	1	1	1		1					1				1									

NOTES 1) For MVME224-2 you can read also MVME224A-2

2) Transition board in use: MVME705A and or MVME705B

3) Transition board in use: MVME715

4) Transition board in use: MVME751

5) For configurations with 5.25 inch tape drive, there is only space for one 3.5 inch device.

6) The table-top enclosure of the P9030 can house three 3.5 inch devices.
So, equipped with one 3.5 inch disk and one 3.5 inch streamer there can be added:
a 3.5 inch flexible disk drive or a second 3.5 inch disk drive.

'MODEL P9035-	MEMORY				DATA COMM. AND LAN CONTROLLERS							TAPE DRIVE INCL. CU and SCSI DEVICES			SCSI DISK DRIVES				ENCLO- SURE
	1) 257 B	1) 257 C	2) 258 B	2) 258 C	332 PA1	332 PA2	332 XT	333 -2	333 X.25	338	374	4) 853	854	856	4) 864	865	866	5) 888	
R200	1		1		1	1	2	1	1	1	1	1	1		1	1	1	1	1
R200		1		1	1	1	2	1	1	1	1	1	1		1	1	1	1	1

NOTES

- 1) The MVME187 RISC Single Board Computer is equipped with one MVME257B (16Mbyte memory) or one MVME257C (32Mbyte memory) mezzanine board.
- 2) The MVME187 with MVME257 can be upgraded with one MVME258B (16Mbyte memory) or with one MVME258C (32Mbyte memory).
- 3) Transition board in use: MVME705A and/or MVME705B.
- 4) The table-top enclosure of the P9035 can house three 3.5 inch devices, because of cooling reasons only 1 disk drive is allowed.
- 5) The MVME888 CD ROM is an external SCSI device.

1.1.4 Model Overview P9050 (Old cabinet)

MODEL P9050	SYSTEM NAME SYS xxxxx	PROCESSOR				MEMORY		DISK CU	DISK DRIVES						TAPE CU	TAPE DRIVES				REMARKS	
		MVME	MPU	SPEED MHZ	TRANS. BOARD	MVME	MAX.		MANU FACT.	TYPE	I NTER FACE	CAP	MAX SUP.	MVME		MANU FACT.	TYPE	INTER FACE	CAP		
002	2334NY012	134	68020	16.7	716			320	841	MICRO POLIS	1325	MB ST-506	67MB	1	350	851	ARCHIVE	59452-2	QIC-2	60MB	ECD
003	2334NY022	134	68020	16.7	716			323	842	CDC	WREN III	ESDI ST-506	161MB	1	350	851	ARCHIVE	59452-2	QIC-2	60MB	ECD
004	2316NY112	132DOF	68020	16.7	707-A	2x 204	4	320	841	MICRO POLIS	1325	MB ST-506	67MB	1	350	851	ARCHIVE	59452-2	QIC-2	60MB	ECD
005	2316NY132	132DOF	68020	16.7	707-A	205	3	320	841	MICRO POLIS	1325	MB ST-506	67MB	1	350	851	ARCHIVE	59452-2	QIC-2	60MB	ECD
006	2316NY122	132DOF	68020	16.7	707-A	2x 204	4	323	842	CDC	WREN III	ESDI	161MB	1	350	851	ARCHIVE	59452-2	QIC-2	60MB	ECD
007	2316NY142	132DOF	68020	16.7	707-A	205	3	323	842	CDC	WREN III	ESDI	161MB	1	350	851	ARCHIVE	59452-2	QIC-2	60MB	ECD
301	3304NY042	147	68030	20.0	712	224-2	2	-	872	SEA GATE	ST-157N	SCSI	48MB	2	-	853	ARCHIVE	VIPER	SCSI	150MB	SCSI bus adapter on the MVME147 ECD
302	3308NY042	147A	68030	20.0	712	224-2	2	-	872	SEA GATE	ST-157N	SCSI	48MB	2	-	853	ARCHIVE	VIPER	SCSI	150MB	ECD
303	3304NY082	147	68030	20.0	712	224-2	2	-	873	SEA GATE	ST-296N	SCSI	85MB	2	-	853	ARCHIVE	VIPER	SCSI	150MB	ECD
304	3308NY082	147A	68030	20.0	712	224-2	2	-	873	SEA GATE	ST-296N	SCSI	85MB	2	-	853	ARCHIVE	VIPER	SCSI	150MB	ECD
305	3304NY152	147	68030	20.0	712	224-2	2	-	874	CDC	WREN III	SCSI	150MB	1	-	853	ARCHIVE	VIPER	SCSI	150MB	ECD
306	3308NY152	147A	68030	20.0	712	224-2	2	-	874	CDC	WREN III	SCSI	150MB	1	-	853	ARCHIVE	VIPER	SCSI	150MB	ECD
308	3308NY302	147A	68030	20.0	712	224-2	2	-	875	CDC	WREN IV	SCSI	300MB	1	-	853	ARCHIVE	VIPER	SCSI	150MB	ECD
310	3308NY602	147A	68030	20.0	712	224-2	2	-	876	CDC	WREN V	SCSI	600MB	1	-	853	ARCHIVE	VIPER	SCSI	150MB	ECD

NOTES: Memory on the MVME147 4Mbyte
MVME147A 8Mbyte

ECD stands for End Commercial Delivery

MVME Modules Supported in P9050-Models (Old cabinet)

	MEMORY			DISK-CU		DATA COMM. AND LAN CONTROLLERS												TAPE CU		DISK DRIVES		SCSI DISK DRIVES				DISKETTE DRIVES				TAPE DRIVE													
	1)	204	205	224	224	320	320	323	330	330	332	332	332	332	333	333	335	336	374	STREA MER	355	355	841	842	843	872	873	874	875	876	831 XT	832	832 XT	881	883	851	852	853	P3544 or P3549				
						1	1	1	1	2	1	1	2	2	1	1	1	1		1	1		1	1								1											
002																																											
003						1	1	1	1	2	1	1	2	2	1	1	1	1		1	1		1	1								1											
004	2	1				1	1	1	1	2	1	1	2	2	1	1	1	1		1	1		1	1																			
005	2	1				1	1	1	1	2	1	1	2	2	1	1	1	1		1	1		1	1																			
006	2	1				1	1	1	1	2	1	1	2	2	1	1	1	1		1	1		1	1																			
007	2	1				1	1	1	1	2	1	1	2	2	1	1	1	1		1	1		1	1																			
301				2					1	1	1	1	2	2	1	1	1	1								1	1	1	1														2
302				2					1	1	1	1	2	2	1	1	1	1							1	1	1	1															2
303 7)				2					1	1	1	1	2	2	1	1	1	1						1	1	1	1																2
304 7)				2					1	1	1	1	2	2	1	1	1	1						1	1	1	1																2
305 7)				2					1	1	1	1	2	2	1	1	1	1						1	1	1	1																2
306 7)				2					1	1	1	1	2	2	1	1	1	1						1	1	1	1																2
308 7)				2					1	1	1	1	2	2	1	1	1	1						1	1	1	1																2
310 7)				2					1	1	1	1	2	2	1	1	1	1							1	1	1	1	1														2

NOTES 1) MVME204 and MVME205 Modules not in the same system

In case MVME320B is in use, module MVME204 must be

revision C or later.

2) To control MVME831XT and MVME841

Max. no. of Fixed Disks per CU : 1

Max. no. of Floppy Disk Drives per CU : 1

3) Transition board in use: MVME710

4) Transition board in use: MVME705A

NOTES 5) Transition board in use: MVME715

Not recommended to use MVME335 and MVME322 in one system

6) Transition board in use: MVME751

7) With the introduction of MVME147 the cabinet is changed to enable the installation of the P2 SCSI backplane adapter/connector

8) Max. of MVME872: 2, Max. of MVME873: 2

9) Max. of MVME874: 2, Max. of MVME875/MVME876 : 1

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

1.1.6 Model Overview P9050 (Enhanced Cabinet)

MODEL P9050	SYSTEM NAME	PROCESSOR				MEMORY		DISK DRIVES						TAPE DRIVES				REMARKS
		MVME	MPU	SPEED MHz	TRANS. BOARD	MVME	MVME	MANU- FACT.	TYPE	INTER- FACE	CAP	MAX SUP.	MVME	MANU- FACT.	TYPE	INTER- FACE	CAP	
403	3404NY104	147S-1	68030	25	712A/B	147 4MB	863	CDC	94351- 126	SCSI	104MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
404	M3400B15 133A3	147SA- 1	68030	25	712A/B	147 8MB	863A	Fujitsu	M2613 ESA	SCSI	104MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
405	M3400B15 183A3	147SA- 1	68030	25	712A/B	147 4MB	864A	Fujitsu	M2614 ESA	SCSI	172MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
413	3404NY106	147S-1	68030	25	712A/B	147 8MB	863	CDC	94351- 126	SCSI	104MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
414	M3400B15 135A3	147SA- 1	68030	25	712A/B	147 8MB	863A	Fujitsu	M2613 ESA	SCSI	104MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
415	M3400B15 185A3	147SA- 1	68030	25	712A/B	147 8MB	864A	Fujitsu	M2613 ESA	SCSI	104MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
418	M3400B15 305A3	147SA- 1	68030	25	712A/B	147 8MB	875	CDC	WREN IV	SCSI	300MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
420	M3400B15 605A3	147SA- 1	68030	25	712A/B	147 8MB	876	CDC	WREN V	SCSI	600MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
431	M3400C15 133A3	147SB-1	68030	25	712A/B	147 16MB	863A	Fujitsu	M2613 ESA	SCSI	104MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
432	M3400C15 135A3	147SB-1	68030	25	712A/B	147 16MB	863A	Fujitsu	M2613 ESA	SCSI	104MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
433	M3400C15 183A3	147SB-1	68030	25	712A/B	147 16MB	864A	Fujitsu	M2614 ESA	SCSI	172MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
434	M3400C15 185A3	147SB-1	68030	25	712A/B	147 16MB	864A	Fujitsu	M2614 ESA	SCSI	172MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
435	M3400C15 305A3	147SB-1	68030	25	712A/B	147 16MB	875	SEA- GATE	WREN IV	SCSI	300MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
436	M3400C15 605A3	147SB-1	68030	25	712A/B	147 16MB	876	SEA- GATE	WREN V	SCSI	600MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
437	3416NY1004	147SB-1	68030	25	712A/B	147 16MB	877	SEA- GATE	WREN V	SCSI	1GB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
438	3416NY1006	147SB-1	68030	25	712A/B	147 16MB	877	SEA- GATE	WREN V	SCSI	1GB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
441	M3400D15 305A3	147SC-1	68030	25	712A/B	147 32MB	875	SEA- GATE	WREN IV	SCSI	300MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
444	3432NY304	147SC-1	68030	25	712A/B	147 32MB	875	SEA- GATE	WREN IV	SCSI	300MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
446	3432NY604	147SC-1	68030	25	712A/B	147 32MB	876	SEA- GATE	WREN IV	SCSI	600MB	2	855	TEAC	25T/N50/ -00-U	SCSI	155MB	ECD
447	M3400D15 605A3	147SC-1	68030	25	712A/B	147 32MB	876	SEA- GATE	WREN V	SCSI	600MB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD
449	M3400D15 1005A3	147SC-1	68030	25	712A/B	147 32MB	877	SEA- GATE	WREN VII	SCSI	1GB	2	853	ARCHIVE	VIPER	SCSI	150MB	ECD

ECD stands for End of Commercial Delivery

Model Overview P9050 RISC (Enhanced Cabinet)

MODEL P9050	SYSTEM NAME	PROCESSOR					Disk and TAPE CU MVME	DISK DRIVES						TAPE DRIVES					REMARKS	
		MVME	MPU	CACHE SIZE	SPEED MHz	TRANS. BOARD		MVME	MANU- FACT.	TYPE	INTER- FACE	CAP	MAXS UP.	MVME	MANU- FACT.	TYPE	INTER- FACE	CAP		
R111	8408NY305	181-1	88100	32Kb	20	714	327A	236-2 236-3	875	SEA- GATE	94181- 348	SCSI	300MB	2	853	ARCHIVE	VIPER	SCSI	150MB	Not released
R112	8408NY605	181-1	88100	32Kb	20	714	327A	236-2 236-3	876	SEA- GATE	94181- 702	SCSI	600MB	2	853	ARCHIVE	VIPER	SCSI	150MB	Not released
R220	M8440C1A3	1885P- 5-16	88100	64Kb	25	714		288-16												
R240	M8440E1A3	1885P- 5-64	88100	64Kb	25	714		288-64												
D220	M8440C2A3	188DP- 2-16	88100	128Kb	25	714		288-16												
D240	M8440E1A3	188DP- 2-64	88100	128Kb	25	714		288-64												

NOTES: The basic RISC configurations are without disk and tape devices.

Model Overview P9045

MODEL P9045-	1) SYSTEM NAME	PROCESSOR					DISK and TAPE CU MVME	DISK DRIVES					TAPE DRIVES					REMARKS			
		2) MVME		CACHE SIZE	SPEED MHz	3) TRANS.B OARD		MEMORY		MVME	MANU- FACT.	TYPE	I INTER- FACE	CAP	MAXS UP.	MVME	MANU- FACT.		TYPE	INTER- FACE	CAP
		MVME	MPU					MVME	MAX												
R200	M8420A3	187B	88100	32Kb	25	712A/B/C	187	257B 258B	865 866	Fujitsu Fujitsu	M2622SA M2624SA	SCSI	330MB 529MB	1	853	ARCHIVE	VIPER	SCSI	150MB		
R200	M8420A3	187C	88100	32Kb	25	712A/B/C	187	257C 258C	865 866	Fujitsu Fujitsu	M2622SA M2624SA	SCSI	330MB 529MB	1	853	ARCHIVE	VIPER	SCSI	150MB		

- NOTES
- 1) The basic system name does not include any memory
 - 2) The MVME187B RISC Single Board Computer is equipped with one MVME257B (16Mbyte memory) mezzanine board.
It can be upgraded with one MVME258B board
The MVME187C RISC Single Board Computer is equipped with one MVME257C (32Mbyte memory) mezzanine board.
It can be upgraded with one MVME258C board
 - 3) The transition module MVME712C does have a thinner transceiver, and external SCSI port. This board may be elected in place of the MVME712B

1.1.7 MVME Modules Supported in P9050 (Enhanced Cabinet)

MODEL P9050	MEMORY				DATA COMM. AND LAN CONTROLLERS										SCSI DISK DRIVES								FDD SCSI		TAPE DRIVES					ENCLO- SURE
	1) 224 -2	1) 224 A-3	1) 224 A-4	330 A B	332 PA1	332 PA2	332 XT	2) 333 -2 X.25	3) 333 X.25	4) 335	336	374	863	864	875	876	876	881	883	884	851	852	853	855	856					
403	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
404	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
405	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
413	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
414	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
415	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
418	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
420	2	2	2		x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
431					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
432					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
433					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
434					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
435					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
436					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
437					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
438					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
441					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
446					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
447					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				
449					x	x	3	1	1	1	1	1	2	2	2	2	2		1				2	2	2	1				

- NOTES1) For MVME224-2 you can read also MVME224A-2
2) Transition board in use: MVME705A and /or MVME705B
3) Transition board in use: MVME715
4) Transition board in use: MVME751

MVME Modules Supported in P9050 RISC (Enhanced Cabinet)

MODEL P9050	MEMORY				DISK and TAPE CU		DATA COMM. AND LAN CONTROLLERS										DISK DRIVES				TAPE DRIVES				ENCLO- SURE
	236 -2	236 -2	288 -16	288 -64	327 A	328 -1	328 -2	332 PA1	332 PA2	332 XT	333 -2	333 X.25	335	336	338	374	875	876	877	881 FDD	853	856	P3544 -001	P3549 -101	
R111	3	3			2			1	2	3	2	1	1	1	2	1	2			1	2	1	1	1	1
R112	3	3			2			1	2	3	2	1	1	1	2	1		2		1	2	1	1	1	1
R220			2			2	2	1	2	3	2	1	1	1	2	1	2	2	2	1	2	1	1	1	1
R240				2		2	2	1	2	3	2	1	1	1	2	1	2	2	2	1	2	1	1	1	1
D220			2			2	2	1	2	3	2	1	1	1	2	1	2	2	2	1	2	1	1	1	1
D220				2		2	2	1	2	3	2	1	1	1	2	1	2	2	2	1	2	1	1	1	1

MVME Modules Supported in P9045

MODEL P9045	MEMORY				DISK and TAPE CU	SCSI CONTR	DATA COMM. AND LAN CONTROLLERS								DISK DRIVES						TAPE DRIVES				ENCL- SURE
	1) 257B	1) 257C	258B	258C				332 PA1	332 PA2	332 XT	2) 333 -2	2) 333 X.25	338	374	864	865	866	867	881A FDD	884 FDD	888	853	854	856	
R200	1		1		1	1	1	2	3	2	1	2	1	2	2	2	2	2	1	1	1	1	1	1	
R200		1		1	1	1	1	2	3	2	1	2	1	2	2	2	2	2	1	1	1	1	1	1	

NOTES1) The MVME187 RISC Single Board Computer is equipped with one MVME257B (16Mbyte memory) or one MVME257C (32Mbyte memory).
The MVME187 can be upgraded with one MVME258B or one MVME258C.

- 2) Transition board in use: MVME705A and/or MVME705B
3) The MVME88 CD ROM can be built-in in the cabinet, but can be also of the external type.

1.1.8 Model Overview P9070

MODEL P9070	SYSTEM NAME	MVME	APE DRIVES			REMARKS
			N	TYPE	INTER- FACE	CAP
xxx	2016NYY012	131DOF or 131XT	64	9452-2	QIC-2	46MB
001	2616NYY012	132XT	64	9452-2	QIC-2	60MB
002	2616NYY022	132XT	64	9452-2	QIC-2	60MB
003	2616NYY032	132XT	64	9452-2	QIC-2	60MB
004	2616NYY042	132XT	64	9452-2	QIC-2	60MB
303	3604NYY082	147-1	64	VIPER	SCSI	150MB
304	3608NYY082	147A-1	64	VIPER	SCSI	150MB
305	3604NYY152	147-1	64	VIPER	SCSI	150MB
306	3608NYY152	147A-1	64	VIPER	SCSI	150MB
314	M3600C15 1005C3	147SB	64	VIPER	SCSI	150MB
316	3640NYY152	141-1	64	VIPER	SCSI	150MB
320	3640NYY602	141-1	64	VIPER	SCSI	150MB
372	M3640C1T 1005C6	141-3	64	VIPER	SCSI	150MB

NOTES 1) MVME204 can be inds for End Commercial Delivery
2) When using an MN

DRIVES			TAPE CU		TAPE DRIVES					REMARKS
INTER-FACE	CAP	MAX PER CU	MMVE		MVME	MANU-FACT.	TYPE	INTER-FACE	CAP	
SCSI	300MB	4	1475A		853	ARCHIVE	VIPER	SCSI	150MB	ECD
SCSI	600MB	4	1475A		853	ARCHIVE	VIPER	SCSI	150MB	ECD
SCSI	300MB	4	1475B		853	ARCHIVE	VIPER	SCSI	150MB	ECD
SCSI	600MB	4	1475B		853	ARCHIVE	VIPER	SCSI	150MB	ECD
ESDI	161MB	4	350		853Q	ARCHIVE	VIPER	QIC-2	150MB	ECD
ESDI	390MB	4	350		853Q	ARCHIVE	VIPER	QIC-2	150MB	ECD
SCSI	300MB	4	327A		853	ARCHIVE	VIPER	SCSI	150MB	ECD
SCSI	600MB	4	1475C		853	ARCHIVE	VIPER	SCSI	150MB	ECD
SCSI	1GB	4	1475C		853	ARCHIVE	VIPER	QIC-2	150MB	ECD
SCSI	300MB	4	1475C		853	ARCHIVE	VIPER	SCSI	150MB	ECD
SCSI	600MB	4	327A		853	ARCHIVE	VIPER	SCSI	150MB	ECD
SCSI	1GB	4	327A		853	ARCHIVE	VIPER	SCSI	150MB	ECD

Model Overview P9070 RISC

MODEL P9070	SYSTEM NAME	PROCESSOR					MEMORY	DISK and TAPE CU	DISK DRIVES						TAPE DRIVES				REMARKS	
		MVME	MPU	CACHE SIZE	SPEED MHZ	TRANS. BOARD			MVME	MVME	MVME	MANU- FACT.	TYPE	INTER- FACE	CAP	MAX PER CU	MVME	MANU- FACT.		TYPE
R111	8608NV302	181-1	88100	64KB	20	714	236-2 236-3	327A	875	SEA GATE	94171- 348	SCSI	300MB	4	853	ARCHIVE	VIPER	SCSI	150MB	Not released
R112	8608NV602	181-1	88100	64KB	20	714	236-2 236-3	327A	876	SEA GATE	94181- 702	SCSI	600MB	4	853	ARCHIVE	VIPER	SCSI	150MB	Not released
R220	M8640C1C3	1885P- 5-16	88100	64Kb	25	714	288-16													
R220	M8640E1C3	1885P- 5-64	88100	64Kb	25	714	288-64													
D220	M8640C2C3	188DP- 2-64	88100	128Kb	25	714	288-16													
D220	M8640E2C3	188DP- 2-64	88100	128Kb	25	714	288-64													

NOTES: The basic RISC configurations are without disk and tape devices.

Modules Supported in P9070

MEMORY		DISK-CU		4)		DATA COMM. AND LAN CONTROLLERS										TAPE CU		DISK DRIVES		SCSI DISK DRIVES				DISKETTE DRIVES				TAPE DRIVES								
2)	224 A-3	224 A-4	3) 320 -A	3) 320 -B	323	330 A	330 B	5) 332	332 PA1	332 PA2	332 XT	6) 333 X-2	7) 335	8) 336	374	STREMER 350	355	841	842	843	873	874	875	876	877	831 XT	832 XT	832 XT	SCSI 881	SCSI 883	851	852	853	856	P3544 or P3549	
			2	1		1	1	5	x	x	5	2	1	1	1		1	1	2	3						1	1								1	
				2	1	1	1	5	x	x	5	2	1	1	1		1	1	2	3						1		1							1	
				2	1	1	1	5	x	x	5	2	1	1	1		1	1	2	3						1		1							1	
				2	1	1	1	5	x	x	5	2	1	1	1		1	1	2	3						1		1							1	
				2	1	1	1	5	x	x	5	2	1	1	1		1	1	2	3						1		1							1	
5						1	1		x	x	5	2	1	1	1																					
5						1	1		x	x	5	2	1	1	1						3	3	3	3	3											
5						1	1		x	x	5	2	1	1	1						3	3	3	3	3											
5						1	1		x	x	5	2	1	1	1						3	3	3	3	3											
5						1	1		x	x	5	2	1	1	1						3	3	3	3	3											
									x	x	5	2	1	1	1																					
									x	x	5	2	1	1	1																					
									x	x	5	2	1	1	1																					
									x	x	5	2	1	1	1																					
4	2				1	1	1		x	x	5	2	1	1	1		1																			
4	2				1	1	1		x	x	5	2	1	1	1																					
4	2				1	1	1		x	x	5	2	1	1	1		1																			
4	2				1	1	1		x	x	5	2	1	1	1																					
4	2				1	1	1		x	x	5	2	1	1	1																					
									x	x	5	2	1	1	1																					
									x	x	5	2	1	1	1																					
									x	x	5	2	1	1	1																					
									x	x	5	2	1	1	1																					
4	2								x	x	5	2	1	1	1																					
4	2								x	x	5	2	1	1	1																					

MVME205 may not be mixed with other memory modules

For MVME224-2 you can read also MVME224A-2

To control MVME831; MVME832 and MVME841

Transition board in use : MVME717

Transition board in use: MVME710

Transition board in use: MVME705A or MVME705B

NOTES 7) Transition board in use : MVME715

Not recommended to use MVME335 and MVME332 in one system

8) Transition board in use : MVME751

MVME Modules Supported in P9070 RISC

MODEL P9070	MEMORY				DISK TAPE CU		DATA COMM. AND LAN CONTROLLERS								DISK DRIVES				TAPE DRIVES			
	236 -2	236 -3	288 -16	288 -64	327A	328-1	328-2	332 PA1	332 PA2	332 XT	333 -2	333 X.25	336	338	374	875	876	877	883 FDD	881 FDD	853	856
R111	4	2			4			5	3	5	2	1	1	1	1	4			1		2	1
R112	4	2			4			5	3	5	2	1	1	1	1		4		1		2	1
R220			2			2	2	5	3	5	2	1	1	4	1	4	4	4		1	2	1
R240				4		2	2	5	3	5	2	1	1	4	1	4	4	4		1	2	1
D220		2				2	2	5	3	5	2	1	1	4	1	4	4	4		1	2	1
D240				4		2	2	5	3	5	2	1	1	4	1	4	4	4		1	2	1

1.1.10 Model Overview P9090

MODEL P9090-	SYSTEM NAME	PROCESSOR			MEMORY		DISK/TAPE CU		DISK DRIVES						TAPE DRIVES				REMARKS		
		MVME	MPU	SPEED MHZ	TRANS. BOARD	* MVME	MAX.	DISK MVME	TAPE MVME	MVME	MANU- FACT.	TYPE	I INTER- FACE	CAP	MAX PER CU	MVME	MANU- FACT.	TYPE		INTER- FACE	CAP
317	M3840B1E 395C4	141-2	68030	33.0	714	224A-2	5	323	350	843	SEAGA TE	WREN V	ESDI	390MB	4	853Q	ARCHIVE	VIPER	QIC-2	150MB	ECD
318	M3840B1T 305C4	141-2	68030	33.0	714	224A-2	5	327A	327A	875	SEAGA TE	WREN IV	SCSI	300MB	4	853	ARCHIVE	VIPER	SCSI	150MB	ECD
320	3840NY602	141-2	68030	33.0	714	224-2	5	327A	327A	876	CDC	WREN V	SCSI	600MB	4	853	ARCHIVE	VIPER	SCSI	150MB	ECD
360	3845NY602	141-3	68030	50.0	714	224-2	5	327A	327A	876	CDC	WREN V	SCSI	600MB	4	853	ARCHIVE	VIPER	SCSI	150MB	ECD
370	M3840C1T 605C6	141-3	68030	50.0	714	224A-3	4	327A	327A	876	SEAGA TE	WREN VII	SCSI	600MB	4	853	ARCHIVE	VIPER	SCSI	150MB	ECD
372	M3840C1T 1005C6	141-3	68030	50.0	714	224A-3	4	327A	327A	877	SEAGA TE	WREN VII	SCSI	1GB	4	853	ARCHIVE	VIPER	SCSI	150MB	ECD

* The MVME224-2 is replaced by the MVME224A-2.

ECD stands for End Commercial Delivery

Model Overview P9090 RISC

MODEL	SYSTEM NAME	PROCESSOR				MEMORY	DISK DRIVES				TAPE DRIVES				REMARKS			
		MVME	MPU	CACHE SIZE	SPEED MHz	TRANS. BOARD	MVME	MANU-FACT.	TYPE	INTER-FACE	CAP	MAX PER CU	MVME	MANU-FACT.		TYPE	INTER-FACE	CAP
R111	8864SP614	188SP-3	88100	64KB	20	714	288-16	327A	SEA GATE	94171-348	300MB	4	853	ARCHIVE	VIPER	SCSI	150MB	ECD
R112	8864DP614	188DP-3	88100	64KB	20	714	288-16	327A	SEA GATE	94181-702	600MB	4	853	ARCHIVE	VIPER	SCSI	150MB	ECD
R220	M8840C1C3	188SP-5-16	88100	64KB	25	714	288-16											
R240	M8840E1C3	188SP-5-64	88100	64KB	25	714	288-64											
D220	M8840C2C3	188DP-2-64	88100	128KB	25	714	288-16											
D220	M8840E2C3	188DP-2-64	88100	128KB	25	714	288-64											

NOTE: The basic RISC configurations are without disk and tape devices.

ECD stands for End Commercial Delivery

1.1.11 MVME Modules Supported in P9090

MODEL P9090	MEMORY			DISK CU	SCSI CU	DC LAN I/O CONTROLLERS										TAPE CU	DISK DRIVES ESDI		DISK DRIVES SCSI		FLEX. DISK DRIVES SCSI		TAPE DRIVES SCSI						
	224 -2	224A -2	224A -3			224A -4	323	327A	330 A	332 PA1	332 PA2	332 XT	333 -2	333 X25	336		338	374	350	842	843	875	876	881	883	853Q	853	856	P354A P3549
317	5	5	4	2	1		1	8	4	8	2	1	1	1	1	1	1	4	4	4	4		1	1	2		1		
318	5	5	4	2		1	1	8	4	8	2	1	1	1	1	1			4	4		1	1	2		1			
320	5	5	4	2		1	1	8	4	8	2	1	1	1	1	1			4	4		1	1	2		1			
360	5	5	4	2		1	1	8	4	8	2	1	1	1	1	1			4	4		1	1	2		1			
370	5	5	4	2		1	1	8	4	8	2	1	1	1	1	1			4	4		1	1	2		1			
372	5	5	4	2		1	1	8	4	8	2	1	1	1	1	1			4	4		1	1	2		1			

The MVME224-2 is replaced by the MVME224A-2.

MVME Modules Supported in P9090 RISC

MODEL P9090	MEMORY		SCSI CU		DC LAN I/O CONTROLLERS							DISK DRIVES SCSI		FLEX. DISK DRIVES SCSI		TAPE DRIVES SCSI			
	288-16	288-64	327A	328-1	328-2	332 PA1	332 PA2	332 XT	333 -2	333 X25	338	374	875	876	877	881	883	853	856
R111	4		2			8	4	8	2	1	1	1	4	4	4		1	2	1
R112	4		2			8	4	8	2	1	1	1	4	4	4		1	2	1
R220	4			2	2	8	4	8	2	1	1	1	4	4	4	1		2	1
R240		4		2	2	8	4	8	2	1	1	1	4	4	4	1		2	1
D220	4			2	2	8	4	8	2	1	1	1	4	4	4	1		2	1
D240		4		2	2	8	4	8	2	1	1	1	4	4	4	1		2	1

1.3.2.25 System Reconfiguration Procedures (sysgen)

Purpose: to rebuild the operating system after changes made in the hardware and/or operating system software.

Syntax: Sysgen

Typing Conventions:

Key	Meaning
arrow left or < ^h >	backspace
c	change field; (de)select line
s	in case of R3V6 or higher, the old c command to (de)select lines is changed to the s command
arrow down or j	move cursor down
arrow up or k	move cursor up
n	no to sysgen prompt
o	open near screen
q	close current screen
y	yes to sysgen prompt
i	in case of R3V6 or higher a complete list of all commands can be obtained with i command

NOTES: 1. *The System Administrator's Reference Manual contains detailed information about this utility.*

2. *Do not remove something from the kernel configuration, unless specified via a Service Information or Technical Documentation or a Software Release Guide. Removing items will result very soon in a lot of failures during rebuilding.*

3. *If the Kernel (re)build failed, you have available the following files:*
/sysV68 new Kernel, see */stand/sysV68*
/oldsysV68 old Kernel, moved from */sysV68* after reboot
/sysV68.rel originally installed Kernel
/stand/sysV68 file changed by sysgen, it is linked to */sysV68* after reboot

*It should be possible to boot from /oldsysV68 or /sysV68. rel.
If so, remove /stand/sysV68 and copy the bootable file to /stand/sysV68.
Power down the system and reboot or execute sysadm reboot.*

In case of the 88k (RISC) system the files are:
/unix new Kernel, see */stand/unix*
/oldunix old Kernel, moved from */unix* after reboot
/unix.rel originally installed Kernel
/stand/unix file changed by sysgen, it is linked to */unix* after reboot

(Technical Tip, nr. P9070-12, 08-12-1987).

5. The directory: /usr/adm/ports contains the system's transition board port configurations.
7. MVME332XT with part number 01-W3475B01 and Rev. E does not support Printronix printer cables of 50 feet.
This problem is solved by replacing some IC's, see SI P9070-050.

NOTE: For configuration of the SMM338, see the Software Release Guide of the software installation tape for the SMM338 (tape SH 83.02).

1.3.2.24 Powerdown/Shutdown

Powerdown:

Usage → powerdown [-y | -Y]

Meaning → -y = shutdown after 60 second warning
 -Y = shutdown immediately, no delay

Effect → Powerdown will:

- stop all running programs
- close any open files
- write out buffers to disk
- unmounts the marked file systems and sets the file system state to OK
- report that the machine is secured for powering down.

Shutdown:

Usage → shutdown [-y] [-g <grace-period>] [-i <init-state>]

Meaning → -y = shutdown after 60 second warning
 -g = shutdown after <grace-period> warning
 -i = run level you want the system to be taken (down) to

Effect → Shutdown with the option -g200 for example will:

- stop **Not All** running programs but will take the system down, after a period of 200 seconds, to single user mode !!!
- when in single user mode you can type in 'sync;sync;sync' in order to purge the buffers and thus writing them to disk;
- **However**, apparently the file system state is **not** set to o.k., because when you start up the system after any type of shutdown you **always** get an automatic file system check.

- h. Login as **powerdown** makes it possible to secure the system for powering down.

NOTES:

1. Floppies initialized via the login **makefsys** cannot be:
 - Mounted with `mnt` or `mount /dev/02s0 /flp`
 - Checked with: `fsck /dev/r02s0`
2. Floppies initialized via the login **makefsys** can be:
 - mounted with : `mount /dev/02s7 /flp`
or : `mount /dev/SA:diskette1 /flp`
 - checked with : `fsck /dev/r02s7`
or : `fsck /dev/rSA:diskette1`
 - unmounted with : `umount /dev/02s7`
or : `umount /dev/SA:diskette1`

System Logins:

System logins are normally not used to login, they are used to create an owner for certain system files.

For example the `lp` login owns all files of the `lp` spooler. Some logins can be used to login, like:

- a. Login as **root** gives you the super user rights. There are no restrictions at all.
- b. Login **uucp** owns the object and spooled data files of the `uucp` function.
- c. Login **nuucp** is used by remote machines to log into the system and to initiate file transfers.

1.3.2.23 Configuration of Serial I/O Controllers

1. Minimum software release level is: FE 83.15 (system V 68 R3V4)
2. Type (in single user mode) : **/etc/portconfig -m**. to perform the configuration of the serial ports.

/etc/portconfig -m

Removes the existing `tty` nodes and build new nodes based on:

- the drivers configured into the most recently built kernel
- the current hardware configuration

3. Type : **/etc/portdisplay**

Shows the configured backpanel modules, after **/etc/portconfig -m** was run

4. The MVME335, MVME332XT and MVME147 are equipped with a parallel port with a Centronic compatible interface. When an Epson printer is connected to this parallel port one extra linefeed is performed for each printed line. The reason is that pin number 14 of MVME335/332XT/147 is ground and pin 14 in the Epson printer (all models) has the signal AUTOFEED-XT connected to it.

The signal AUTOFEED-XT is an active low signal which results in the extra linefeed per printed line.

The problem is solved by disconnecting pin 14 in the printer interface cable.

- b. Login as **setup** makes it possible to:
- set the timezone
 - setup logins
 - establish passwords for administrative logins
 - establish passwords for system logins
 - set the node name for the machine

- c. Login as **sysadm** presents the following menu:

SYSTEM ADMINISTRATION

- | | |
|-----------------|--------------------------|
| 1. diagnostics | system diagnostics menu |
| 2. diskmgmt | disk management menu |
| 3. filemgmt | file management menu |
| 4. machinmgmt | machine management menu |
| 5. packagemgmt | package management menu |
| 6. softwaremgmt | software management menu |
| 7. syssetup | system setup menu |
| 8. ttymgmt | tty management menu |
| 9. usermgmt | user management menu |

Enter a number, a name, the initial part of a name, or ? or <number> ? HELP, q to QUIT: q.

- d. Login as **makefsys** makes it possible (on a removable media) to:

- label the removable medium
- enter a file system name on the removable medium
- enter a maximum number of this files and directories (≤ 180)
- initialize the file system
- mount the file system
- unmount the file system

- e. Login as **checkfsys** makes it possible (on a removable media) to:

- check (no repairs attempted) the file system
- interactive repair the file system
- automatic repair the file system

- f. Login as **mountfsys** makes it possible to mount the file system present on the flexible disk.

- g. Login as **unmountfsys** makes it possible to unmount the file system on the flexible disk.

1.3.2.21 Remote Support

Details will be filled in at a later date (this is still the case).

1.3.2.22 Overview and Explanation of Administrative and System Logins

Administrative Logins

- | | | |
|----|------------|---|
| a. | br | Backup and restore |
| b. | setup | Setup your system |
| c. | sysadm | System administration |
| d. | makefsys | Make (create) file systems on removable media |
| e. | checkfsys | Check the file systems on removable media |
| f. | mountfsys | Mount file systems on removable media |
| g. | umountfsys | Unmount file systems on removable media |
| h. | powerdown | Secure your system for powerdown |

System Logins

root
sys
bin
adm
uucp
nuucp
rje
daemon
trouble
lp

Administrative Logins:

Should be run in single user mode with the source file system(s) mounted.

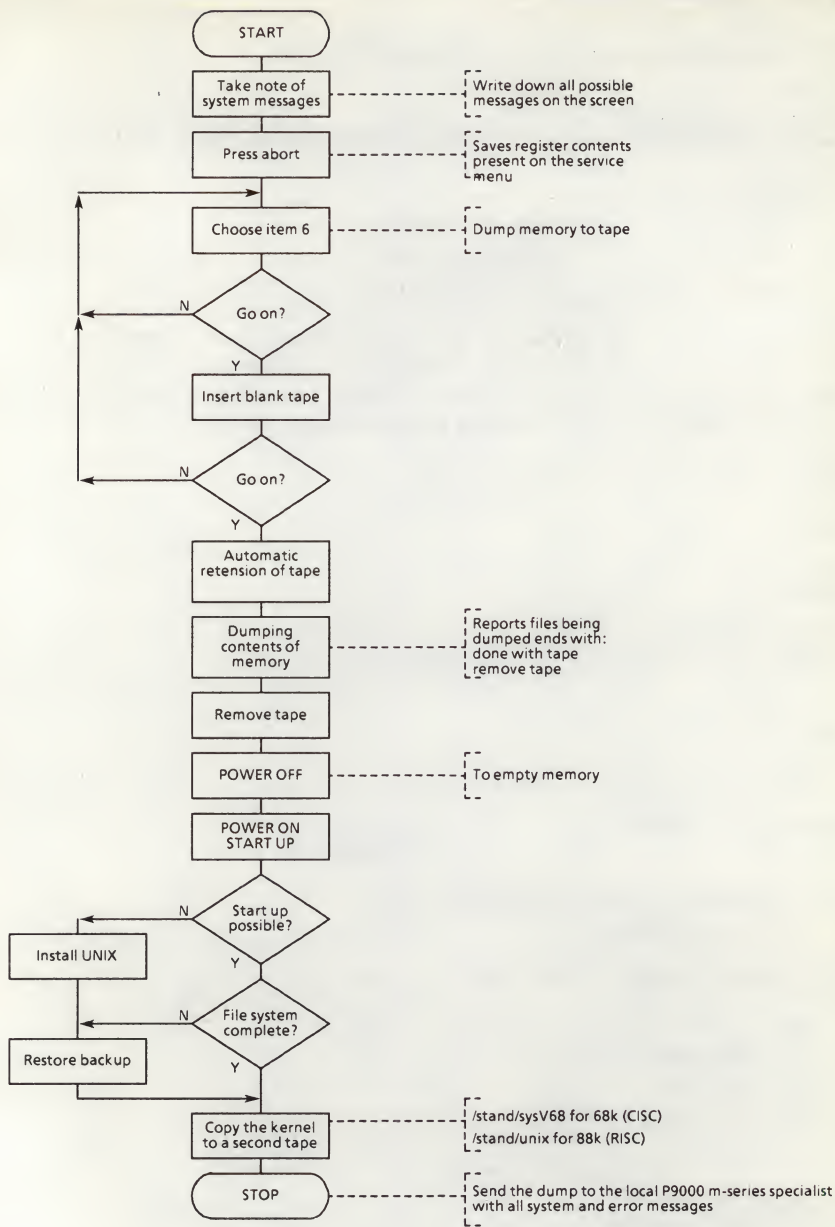
- a. Login as **br** presents the following menu:

Back-up and Restore

** WARNING ONLY-- Run - level is 2 instead of S

Back-up and Restore functions are:

1. INCREMENTAL back-up
 2. FULL back-up
 3. SELECTED back-up
 4. RESTORE files from archive
 5. ARCHIVE description change
 6. PREFERENCES
 0. QUIT this level
- Your choice ? (0-6)



1.3.2.20 Dump Memory to Tape


The most important tool to aid Support Departments in analyzing customer crashes in the field is a kernel core dump. This involves sending two files to your local support specialist. The first is a dump of all physical memory, hereafter called kernel core. The other is the kernel, /unix on 88k or /sysV68 on 68k. There are two ways to take a kernel core dump, a System Auto Dump, or a Firmware Dump.

The first way needs setting up the system for the System Auto Dump feature. This is the responsibility of the customer, the system administrator.

The second way, the Firmware Dump, is described below. When you have to make a Dump Memory to Tape **do not power off** the system.

With the dump you should include any information that might be beneficial. Include information on any unusual activity or unusual messages. Include information on hardware configuration, boards present in the system. Include information on software configuration, software packages installed and their revision levels. If available, fill out a UNIX System Crash Report. Always note the format used to make the dump tape(s), either firmware dump or cpio, and if cpio, note which files are on the tape.

sysadm diskreport has the same result as **errpt -ddevice|pg**



m320
m350
etc.

Explanation of the errorcodes, per device, are given in chapter 3.11.

Emptying the error file (/usr/adm/errfile) is a responsibility of the system administrator!!!

1.3.2.19 Accounting

In all newly delivered systems accounting is enabled.

If accounting is not going to be used, switch it off !. Switching on or off the accounting is a responsibility of the system administrator.

Accounting can be switched off by typing:

```
sh /etc/rc2.d/s30acct stop
```

To prevent accounting to be switched on the next time can be done via:

```
mv /etc/rc2.d/S30acct /etc/rc2.d/s30acct
```

In case a system has been used with Accounting enabled and runs short of disk space, it can be useful to remove the accounting file. This can be done as follows:

1. Stop Accounting, if necessary (see above).
2. Remove the pacct files.

```
rm /usr/adm/pacct
```

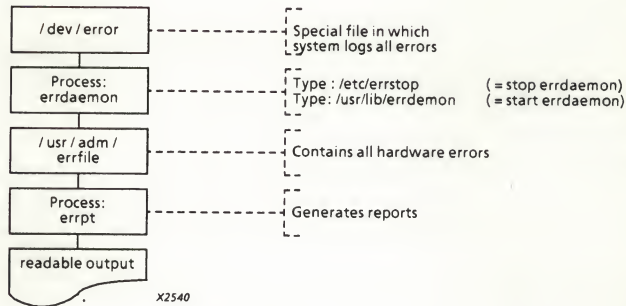
```
rm /usr/adm/pacct1
```

```
rm /usr/adm/pacct2 etc.
```

1.3.2.18 Error Logging

In all newly delivered systems Error logging is enabled.
It is not advisable to switch it off !

Simplified Mechanism:



Examples: **errpt**|pg

Detailed error report about the disk, tape controllers, stray interrupts, and memory reports

errpt -a|pg

Detailed error report (All errors)

\$ = jump to last page

- = skip 1 page backwards, provides summary.

/pattern/ = search for that pattern

errpt -s time|pg

All errors since MMDDHHMMYY

errpt -etime|pg

All errors earlier than MMDDHHMMYY



errpt -f|pg

Limited to unrecovered errors of block devices (only fatal errors)

sysadm diskreport

Errors of the specified device
(Only disk and tape controllers)

- a. Determine type of back-up (relative or absolute) (examples):

```
cpio -ictB < /dev/r40t
```

```
cpio -ictB < /dev/r02s7
```

will report a table of contents on the screen.

Files starting with ./ or without / are 'relative' files and can be restored to any location in the file system you specify !

Files starting with a / are 'absolute' files and will be restored to that same location in the file system again !

- b. Restore back-up:

Absolute full back-up (examples):

————— Create needed directory (don't forget)!

```
cpio -icvdB < /dev/r02s7
```

```
cpio -icvdB < /dev/r40t
```

————— Unconditionally*

```
cpio -icvduB < /dev/r02s7
```

```
cpio -icvduB < /dev/r40t
```

Restore files selectively (examples):

```
cpio -icvdB /usr/martin/file1 < /dev/r02s7
```

```
cpio -icvdB /usr/joop/file1 < /dev/r40t
```

```
cpio -icvduB < /dev/r40t
```

```
cpio -icvduB /usr/fred/file1 < /dev/r40t
```

```
or:          /usr/jannes/file1
```

Don't forget to specify under which directory you want to start the restore !

- * The option 'unconditional' can be very dangerous !.

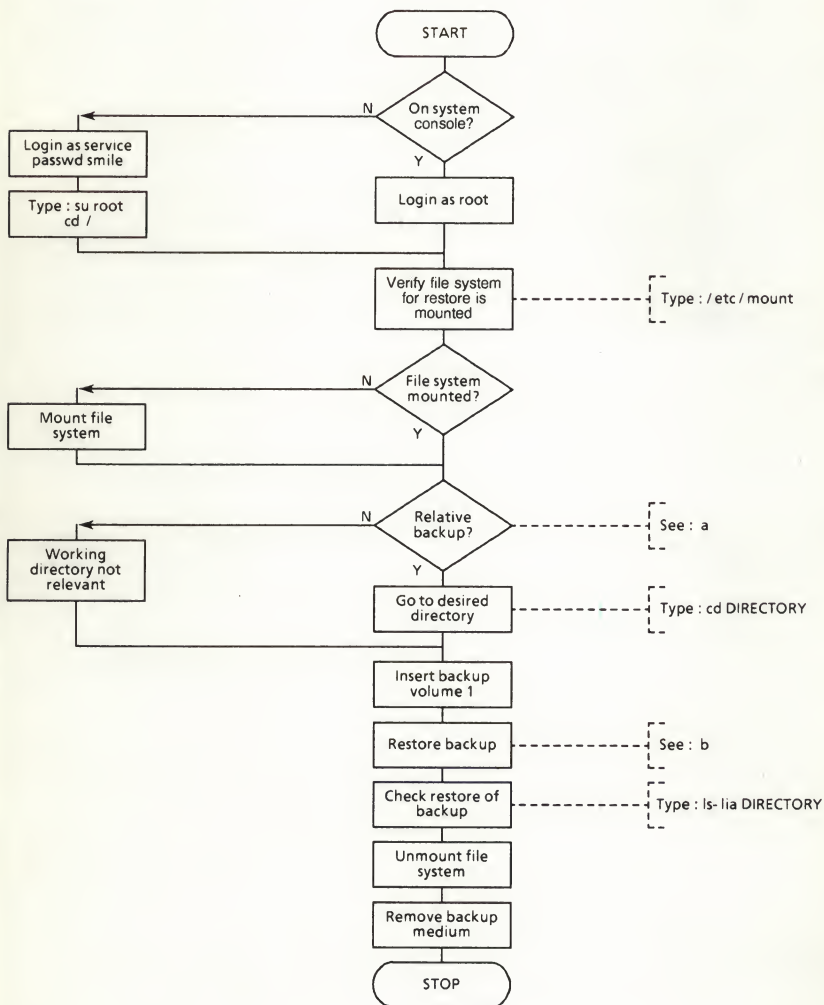
In the unconditional mode an older file, on the backup, will replace a newer file on the medium which does have the same name. So such a newer file is lost and is replaced by the older file from the backup.

cd /;find . -depth -print > /usr/table1

wc -l /usr/table /usr/table1----- reports number of lines of files
table 1 (must be equal !).

rm /usr/table*

1.3.2.17 CPIO to Back-Up Files (Restore)



Full **absolute** back-up:

```
find / -depth -print|cpio -ocvB > /dev/r40t
```

Partial **absolute** back-up:

```
find /u/service -depth -print|cpio -ocvB > /dev/r02s7
```

Absolute back-ups will be restored to the **same location** in the file system, because of specified pathname(s) !

Back-up medium full, results in message:

Error number..; can't write output

If ready to continue, type **/dev/file-name**

Do the following:

- Remove full back-up medium (mark: volume 1)
- Insert new back-up medium (mark: volume 2)
- Type: **/dev/r40t** <CR> or

/dev/r02s7 <CR>

e. Verify the back-up:

For example verify the (partial) back-up of /u/service:

```
cpio -ictB < /dev/r02s7
```

input
report table of contents (on screen)

```
cpio -ictB < /dev/r02s7 > /usr/table
```

report table of contents

```
ls -a /u/service > /usr/table1
```

```
comm -3 /usr/table /usr/table1 ----- report differences between files  
rm/ usr/table*                          table and table 1
```

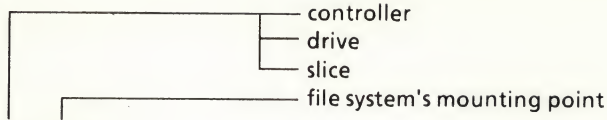
In case of message: '**out of phaseget help**', then:

- media out of sequence----- get them into correct order !
- media not properly formatted ----- re-do the back-up !

For example verify a full back-up:

```
cpio -ictB < /dev/r40t > /usr/table
```

a. Mount file system examples:



mount /dev/01s0 /usr1
or
mount /dev/01s0 /usr2

Unmount after back-up, example:

umount /dev/01s0

b. Media type:

60Mb tape cartridge
120Mb tape cartridge
150Mb tape cartridge
5.25" 653kb floppy
5.25" 1.2 Mb floppy

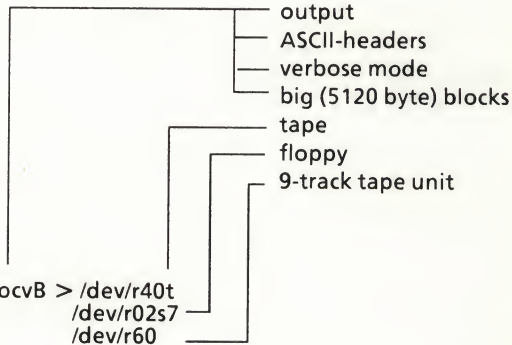
Nr. of 512byte blocks available:

120.000
240.000
300.000
1.264
2.456

c. Insert floppy:

- floppy must be formatted (see section 1.3.2.10.)
- floppy does not need to have a file system (raw/character device)

d. Make back-up (examples)



Full relative back-up
starting directory is / (root):

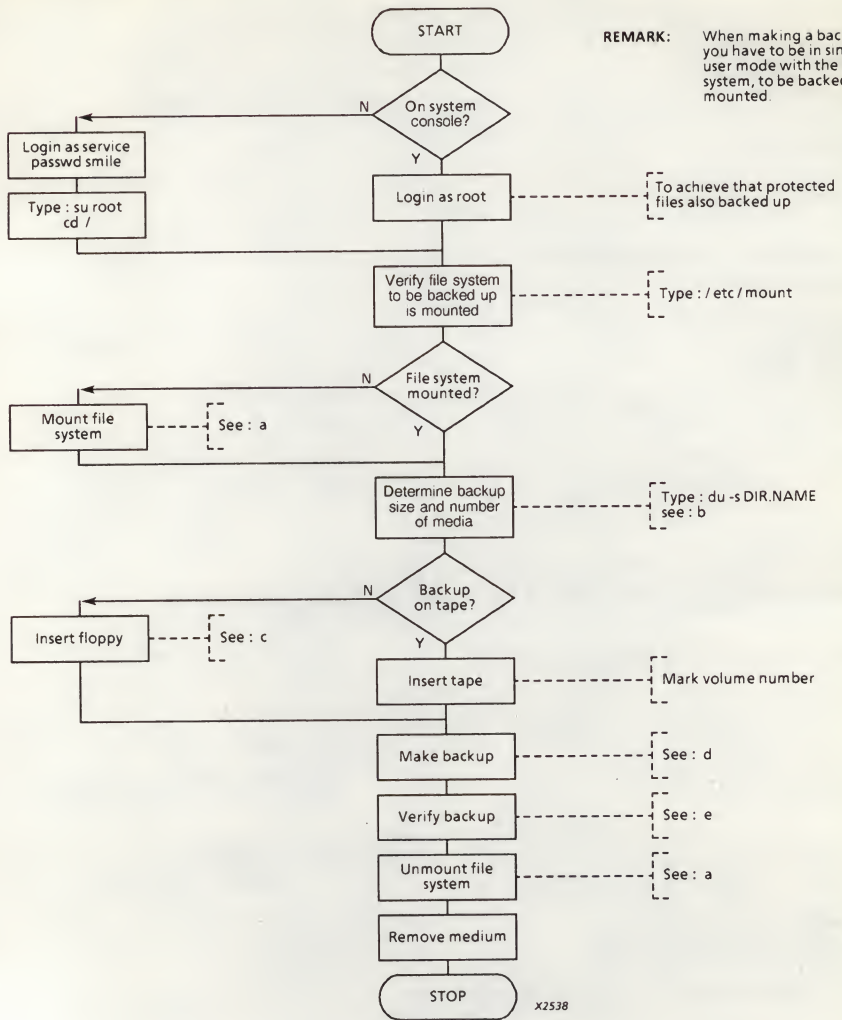
cd /; **find** . -depth -print|**cpio** -ocvB > /dev/r40t
/dev/r02s7
/dev/r60

Partial relative back-up:

cd /u/service; **find** . -depth -print|**cpio** -ocvB > /dev/r40t

Relative back-ups can be restored to any location in the file system !
Absolute back-ups are not recommended !

1.3.2.16 CPIO to BackUp Files (Make and Verify)



On the following pages a summary what to do to make a back-up.

1.3.2.14 Streamer Tape Drive Commands

Utility: **tapectl** (not present on RISC systems)

Format: **/etc/tapectl -OPTION /dev/r40t**

Options: - e = erase

- r = rewind

- t = retension

NOTE: */dev/r40t is pointing to the generic streamer tape driver, /dev/rmt/m327_40t points to the streamer tape connected to the MVME327A.*

1.3.2.15 FIND (Selecting Files)

Format: **find DIRECTORY PATHNAME(S) -SEARCH CRITERIA -ACTIONS**

Search criteria: n = decimal integer (exact value)

+ n = > n

- n = < n

-depth = all files

-name filename = files named filename

-size n = files of size n blocks (512 bytes)

-links n = files with n links

-atime n = files accessed n days ago

-mtime n = files modified n days ago

-newer filename = files modified more recently than file filename

-inum n = file with specified inode number

Actions:

-print = print pathnames of found files

-exec command {} \; = execute specified command

-ok command {} \; = ask for permission to execute specified command

Examples:

find . -depth -print (RELATIVE, pathnames are relative to the working directory)

_____ starting in working directory

find / -depth -print (ABSOLUTE, complete pathnames, starting at the root directory)

_____ starting in the / (root) directory

find / -name filename -print

find . -name /filena* -print

Detailed information (default values !) should be found in the files for printers, working under:

UNIX	/usr/spool/lp/model/ptnrx
Qoffice	/usr/spool/Qspool/printers
Life Works	/usr/spool/lp/model/ptnrx

4. Command Examples

lp file

lp file1 file2 file3

lp -dprintername file

Options:

-oB	[= no banner page]
-oF	[no formfeed between jobs]
-dname	[destination printer name]
-m	[send mail if finished]
-w	[write message if printed]
-t title	[print title on banner]
-n3	[number of copies is 3]

Message: 'lp:printer request name-nr. has been
printed on printer name'
Number of copies is 3

lp -oB -oF -w -n3 filename

mail:'printer request name-nr. has been printed on
printer john'

lp -oB -oF -m filename

print the 'bubble' on banner

lp -w -tbubble filename

lp -w -tbubble filename

5. Utilities **cancel** and **lpstat**

cancel request ID

Example: **cancel john-21**

lpstat -p

Reports status of all printers

lpstat -t

Provides total status report covering printers and the
printer queue.

killall (To kill unwanted processes, also kills lineprinter scheduler (lpsched)

To start lpsched, type: **/usr/lib/lpsched start**

To stop lpsched, type: **/usr/lib/lpshut**

To check, type: **lpstat -t**

In case there is only one printer connected to the system, establish this printer as the system default printer (or use the cmd: **lp -dprintername filename**).

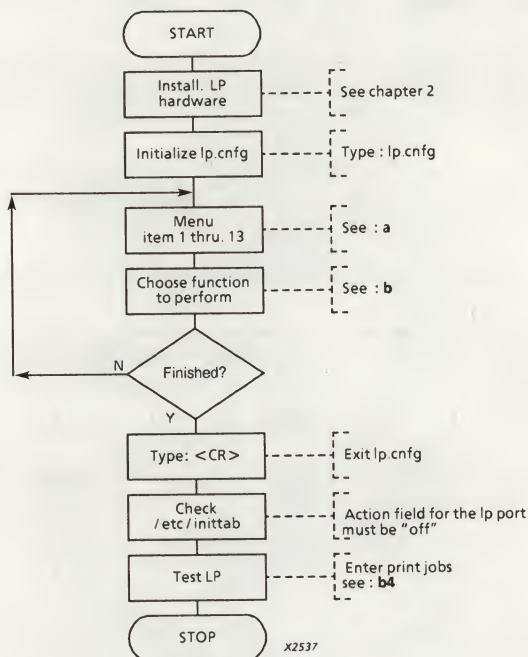
b. Additional remarks:

1. Printer device names:
 - tty01 reserved for modem connection;
 - 'console' reserved for console;
 - e.g. tty11 is: SP1 on first MVME332(XT);
 - e.g. tty28 is: SP8 on second MVME332(XT);
2. Printer names:
 - not longer than 13 characters
 - each name unique
 - use only upper and lower case characters, digits 0 through 9 and underscore character;
 - do not use names 'cpr' or 'lpr'
3. Below a table containing the main characteristics for some printers.

MAIN (DEFAULT) CHARACTERISTICS	UNIX/Q-OFFICE PRINTER TYPES				
	Epson	gp300	ptLJ plaser	ptDW	Explanation
BAUD CSX PARITY CSTOPB PARENB	9600 CS8 -evenp -cstopb -parentb	9600 CS8 -evenp -cstopb -parentb	9600 CS8 -evenp -cstopb -parentb	9600 CS8 -evenp -cstopb -parentb	bits/sec bits/char parity two stop bits/char. (- = one stop bit) parity enable (- = disable)
	EPSON FX800 (P2908) EPSON FX1000 (P2909)	GP300 (P2934) GP310 (P2936)	Qume TEN + (P2973)	Qume S11 + /55 Standard track (P2950) Qume S11 + /55 Wide track (P2951)	

1.3.2.13 LP System Configuration Utility (lp.cnfg)

The utility lp.cnfg is used to configure and maintain the UNIX line printer configuration, for a detailed description of this utility see the UNIX manual page LP.CNFG (1M).



a. Main menu of LP System Configuration Utility:

1. Delete all previous Lp configurations.
2. Add printer configurations into Lp.
3. Change a printer's configuration.
4. Delete one printer from the Lp configuration.
5. Enable a printer.
6. Disable a printer.
7. Display a list of all known printers.
8. Display the status of all printers.
9. Establish the sytem default printer.
10. Assign a class to a printer's configuration.
11. Delete a class from a printer's configuration.
12. Create a "port_hold" for a device.
13. Remove a "port_hold" for a device.

Enter the number of the function you want to perform.
Hit the <RETURN> key when you have finished:

1.3.2.12 Table of Standard Bad Tracks for MVME841

Because of a bug in the MVME320A and the MVME320B it is necessary to declare 32 defects on the disk media connected to these controllers. See for this the table below. The disk connected to the MVME320A or MVME320B is the MVME841, the Micropolis 67Mbyte 5 $\frac{1}{4}$ fixed disk drive.

NOTE: *Standard bad tracks are automatically included with R3V4 or higher when initializing the disk via sysadm.*

HEAD NUMBER	CYLINDER NUMBER
0	254
1	254
2	254
3	254
4	254
5	254
6	254
7	254
0	510
1	510
2	510
3	510
4	510
5	510
6	510
7	510
0	766
1	766
2	766
3	766
4	766
5	766
6	766
7	766
0	1022
1	1022
2	1022
3	1022
4	1022
5	1022
6	1022
7	1022

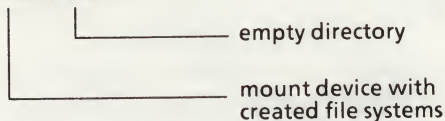
h. Editing /etc/fstab

Edit (with vi) the file: /etc/fstab, and add the wanted entries.

For example: /dev/usrx /usrx

/dev/usry /usry

/dev/usrz /usrz



i. Editing /etc/checklist

Edit (with vi) the file: /etc/checklist, and add the new created file systems, use the character device names.

For example: /dev/rusrx

/dev/rusry

/dev/rusrz

Now the specified file systems are automatically checked at start up if necessary.

NOTE: To be able to use the "br" utility it is necessary to modify also /backups/files/DiskInfo.

j. Checking your work can be done by shutting the system down and starting it up again.

All the newly created file systems must be checked (if necessary) and mounted automatically at system start up.

After the system is up, type: ls -lia /dev/usrx. This should give you the inodenr. and the number of links of that file system.

example: i-nr.

If you type: find /dev -inum 253 -print

You will get on your screen the names of the linked devices.

k. Changing the ownership of the newly created file system(s) is done by changing the ownership of the empty directories which are used as mount points.

For example: chown newowner dirname

'Newowner' may be a numerical uid or a login name.

- d. Creating empty directories which are to be used as mounting points.

Because we need mount points for the newly created file system(s) empty directories must be made.

Examples: `mkdir /usrx`
`mkdir /usry`
`mkdir /usrz`

- e. Creating entries in /dev

We need entries in /dev to be able to access the devices, by identifying them with different names.

These devices must be accessible as character (raw) and as block devices.

The easiest way to do this is via linking.

Examples: `ln /dev/dsk/m323__1s0 /dev/usrx`
`ln /dev/dsk/m323__1s1 /dev/usry`
`ln /dev/dsk/m323__1s2 /dev/usrz`

`ln /dev/rdisk/m323__1s0 /dev/rusrx`
`ln /dev/rdisk/m323__1s1 /dev/rusry`
`ln /dev/rdisk/m323__1s2 /dev/rusrz`

- f. Making lost + found directory per file system. Mount the concerning file system

Example: `mount /dev/usrx /usrx`

Determine the amount of free inodes of that file system (use : `df -t`).

Take one percent of these free inodes as the number of entries in the lost + found directory (multiples of 32).

Example: /usrx has 6238 free inodes.

1% is 62, will be rounded to 64.

Type: `mklost + found /usrx 64`

After the message: 'Reserving 64 entries' unmount that file system (for example: `umount /usrx`).

- g. Checking created file system

Example: `fsck /dev/rdisk/m323__1s0`

NOTES: File system checks are done:

1. on the raw devices;
2. on unmounted file system(s) (type: 'mount' to check!)

In case of errors, fix the cause(s) and run fsck again.

If fsck runs without errors, that file system is alright.

b. Initializing the 2nd FXD

Syntax:

Format disk (ignore the two errors)

Make file systems as specified in /etc/dskdefs/type. Can only be done on the boot device

Read manufacturer's defect list (only for MVME323)
If left out, you must either defect list by

/etc/dinit [-aefimnrRsTx] [-d desc] [-b file] [-t file] type rdev

File in /etc/dskdefs, for example: m323182

(Raw) Device name, for example: /dev/rdsk/m323_1s7

Example: /etc/dinit -fr m323390 /dev/rdsk/

c. Creating and labeling the wanted file system(s)

Syntax: sedit [-q -n -r -v -l -sfile] rdev

m323_1s7

Example: sedit /dev/rdsk/m323_1s7

The utility sedit has a help screen which can be activated by the ?
The sedit help screen is as follows:

k = down	j = up	i = insert	u = undo
h = left	l = right	a = append	^F = next screen
arrow keys	cw = change word	^B = previous screen	
e = end of word	dw = delete word	:q,ZZ = quit	
b = previous word	ESC = end change	:q! = quit (no write)	
w = next word	. = prev insert	:s file = save in file	
r = replace char	l = ignore warning	C = close space	
! = shell escape	? = help	O = open space	

File system offset, size, name and volume id must comply with the specified wishes of the customer, so no more help can be given here.

Leaving sedit with :q,ZZ will cause the automatic creating of the wanted file system(s).

Explanation (Additional FXD)

This section deals with initializing an additional FXD which will not contain a bootloader, no UNIX kernel and no swap area.

This disk will only contain file system(s).

The System Administrator's reference manual contains additional information.

a. Specifying the FXD

In case of R3V4 O.S. or higher, /etc/dskdefs contains the disk templates.

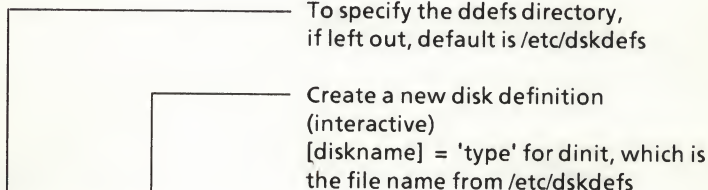
The disk templates contain the disk definitions.

See chapter 18 for the default disk definitions for the supported disks.

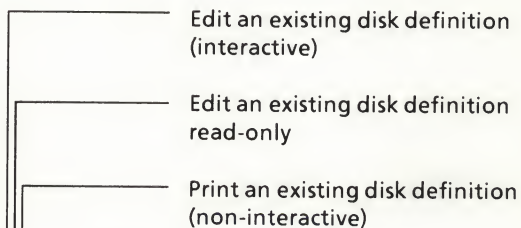
The disk initializer (dinit) is used to initialize the specified disk type.

The disk information manager (ddefs) is used to edit or print the disk definition files in the /etc/dskdefs directory, or the disk definitions present on the media of the disk device itself.

Syntax:

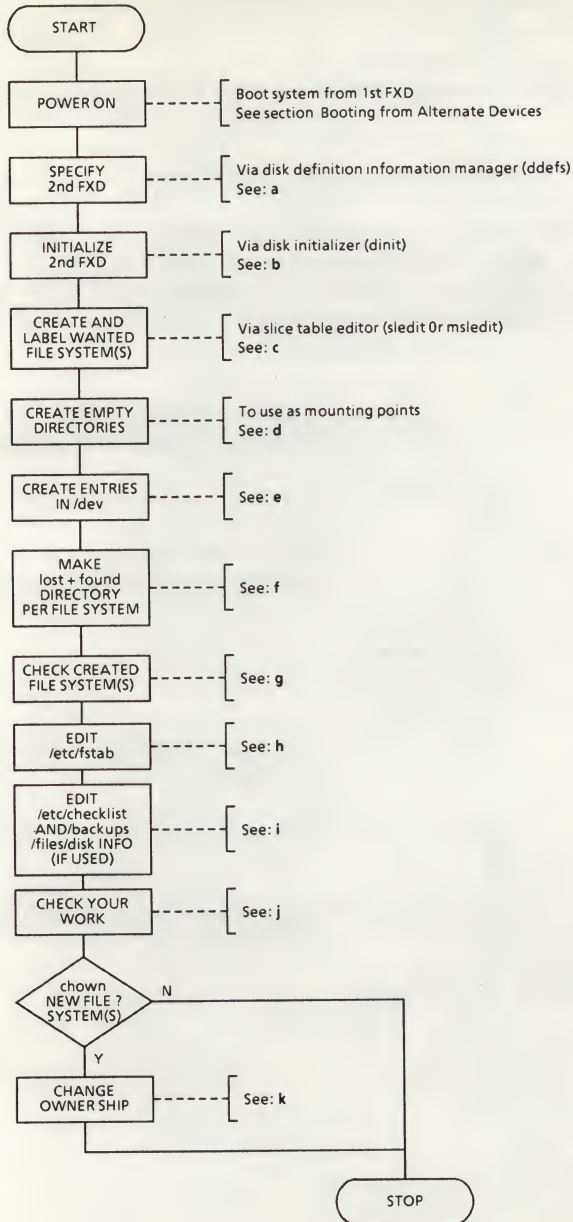


/etc/ddefs [-d ddefsdire] -n [diskname]



/etc/ddefs [-d ddefsdire] -erp diskname

1.3.2.11 Initializing Disk Media - Additional FXD



- g. Create a lost + found directory in the new file system:

syntax: **/etc/mklost + found** *"mounted directory" "nr. of entries"*

example:

/etc/mklost + found /flp 2

Nr. of entries will be set to a multiple of 32.

Nr. of entries = 1% of nr. of i-nodes. (In this case there will be 32 entries).

- h. Unmount filesystem:

syntax: **umount** *"device""* or **umount** *"mounted directory"*

example: **umount** /dev/dsk/m320__2s7 or **umount** /flp

- * See column type in table before for correct type definition
** See culomn (raw)dev in table before for correct device
*** Floppies with file systems created under R3V4 or lower, may present a problem ('not a valid file system') when attempting to mount under R3V5. These file systems must be upgraded to R3V5 via:
/etc/fsck "rawdevice"

d. Create empty file system **:

syntax: **/etc/mkfs** "*rawdevice***" "*number of 512byte blocks*"

example: **S/FD16** (654 Kb floppy)

			nr. of 512 byte blocks in
			slice 7
/etc/mkfs /dev/rdsk/m320__2s7	1276		
or			
/etc/mkfs /dev/rdsk/m320__2s0	1264		nr. of 512 byte blocks in
			slice 0

NOTE: As displayed in the example above, file systems on floppies can be made on **slice 0** and **slice 7**. The 7 in column (raw)dev changes in case of a file system on slice 0 into 0.

In case of **S/FD19** (1.2 Mb floppy or S/FD 42 (1.2 Mb), the number of 512byte blocks are:

filesystem on slice 7: 2400

filesystem on slice 0: 2370

In case of **S/FD10** (320 Kb) or S/FD20 (320 Kb) or S/FD41 (320 Kb):

filesystem on slice 7: 640

In case of **S/FD10** (360 Kb) or S/FD20 (360 Kb) or S/SF41 (320 Kb):

filesystem on slice 7: 720

In case of **S/FD42** (1.44 Mb):

filesystem on slice 7: 2880

e. Label floppy:

Label utility is **labelit**

Syntax: **/etc/labelit** "*device***" "*fsname*" "*VID*"

		Block device
		use devices in table before,
		change rdsk in dsk
/etc/labelit /dev/dsk/m320__2s7	(or 0) fsname VID	

f. Mount filesystem to the mounting point (empty directory):

syntax: **mount** "*device***" "*mounting point*"

example: **mount** /dev/dsk/m320__2s7 /flp

NOTE: ** referring to table before

If a block device is used instead of a character (raw) device rdsk in column (raw)dev of table before must be changed in dsk.

Explanation Initializing Disk Media (Floppies)

In P9000 m-systems, some flexible disk types are used, namely:

1. S/FD16: double sided double density 5¼" 654 Kbyte floppy disk
2. S/FD19: IBM PC/AT 5¼" 1.2 Mbyte floppy disk
3. S/FD41: IBM PC/XT 3½" 320 Kb (8 sect/tr) or 360 Kb (9 sect/tr)
4. S/FD10 or S/FD11: IBM PC/XT 5¼" 320 Kb (8 sect/tr, 40 cyl) or 360 Kb (9 sect/tr, 40 cyl) or 720 Kb (9 sect/tr, 80 cyl)
5. S/FD42: IBM PC/AT 3½" 1.2 Mb (15 sect/tr) or 1.44 Mb (18 sect/tr)

In this section NOT ALL alternative devices are given. For a complete list, see chapter 3.

CONTRL	S/FD16		S/FD18	
	type	(raw) dev	type	(raw) dev
MVME147	m147dsdd5	/dev (r) dsk m147.d60s7	m147pcat	/dev (r) dsk m147.s60s7
MVME320A	m320dsdd5	/dev (r) dsk m320.2s7	-	-
MVME320B	m320dsdd5	/dev (r) dsk m320.2s7	m320sdsdd5	/dev (r) dsk m320.s2s7
MVME327	m327dsdd5	/dev (r) dsk m327.d70s7	m327pcat	/dev (r) dsk m327.s70s7
MVME328	m328dsdd5	/dev (r) dsk m328.006s7	m327pcat	/dev (r) dsk m328.006s8

Format utility for disk media is **dinit**

Syntax: **/etc/dinit** "-options" "type*" "rawdevice**"

- a. Make a formatted floppy with file system bootable:

/etc/dinit -b /stand/m68k/boots/vmeboot type* rawdevice**

- b. Format floppy and make bootable:

syntax: **/etc/dinit -fb /stand/m68k/boots/vmeboot "type*" "rawdevice**"**

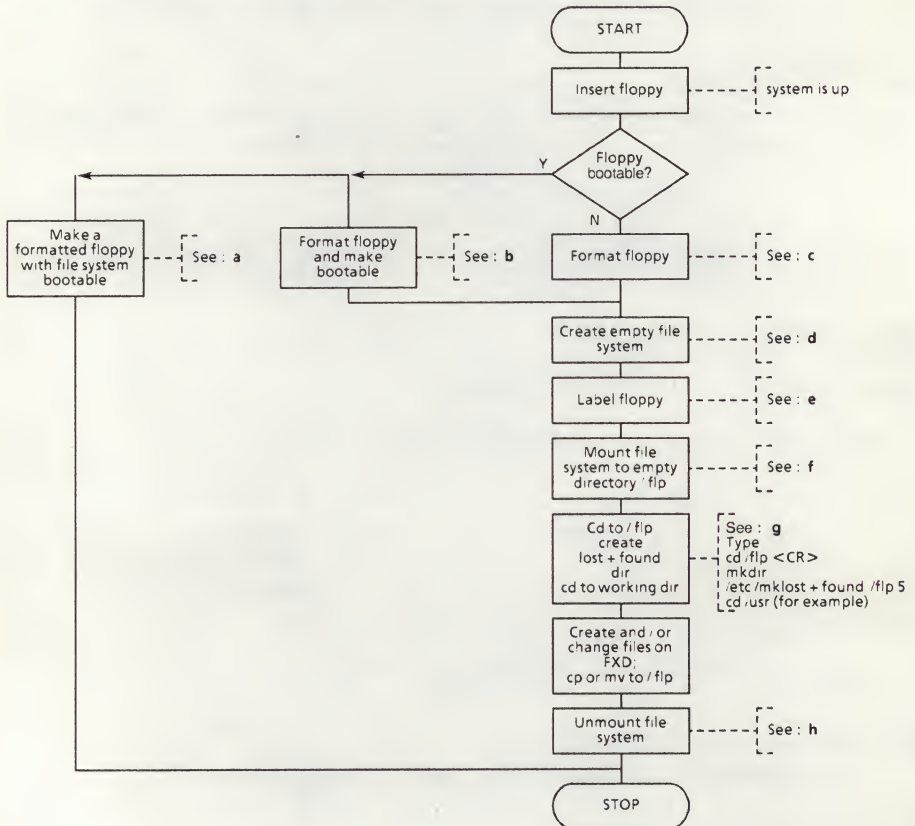
- c. Format floppy:

syntax: **/etc/dinit -f /stand/m68k/boots/vmeboot "type*" "rawdevice**"**

NOTE: * and ** see table above.

2. Check corresponding label of terminal control line for the tty port, in the file:
`/etc/gettydefs`.
NOTE: *Transmit = 9600 bps (for local terminals)*
Transmit = 1200 bps (for remote terminals)
3. Type: `init q <CR>` to force re-read of inittab.
4. Connected terminal should now receive a login prompt.

1.3.2.10 Initializing Disk Media (Floppies)



1.3.2.7 WRITE

The command **write** forces a message to the addressed users.

Type: **wall** = write to all (see notes 1 thru. 3 !)

---text---

< control-d >

or

Type: **write** login name = write to specified user (see: **who**)

---text---

< control-d >

NOTES:

1. If you log onto the system as service and use write, you can not write to users that used the command: **mesg -n**.
2. If you log onto the system as root you can also write to users that used the command: **mesg -n**.
3. Write forces a message to the addressed users and effects the command lines on their screen.

Commands under execution are finished before the message is displayed.

Files under preparation using vi. are only effected on the screen.

1.3.2.8 Creating User Accounts

User accounts can be created by:

- Logging in as **setup** (see section 1.3.2.28).
- Logging in as **sysadm** (to create additional user accounts, see section 1.3.2.28).
- Manually editing the files **/etc/passwd** and **/etc/group**, which will be explained in this section.

Manual creating user accounts is not easy, errors are made very easy, so use the system log-in **setup**.

1.3.2.9 Enable Terminals

NOTE: First run **portconfig -m** to create all the necessary tty-entries in **/dev**.
*Portconfig should be run in Single User Mode with **/usr** mounted.*

1. Check the terminal control line for the tty port in the file:

/etc/inittab (use vi)

Fields in the file **/etc/inittab** are separated via an **:**

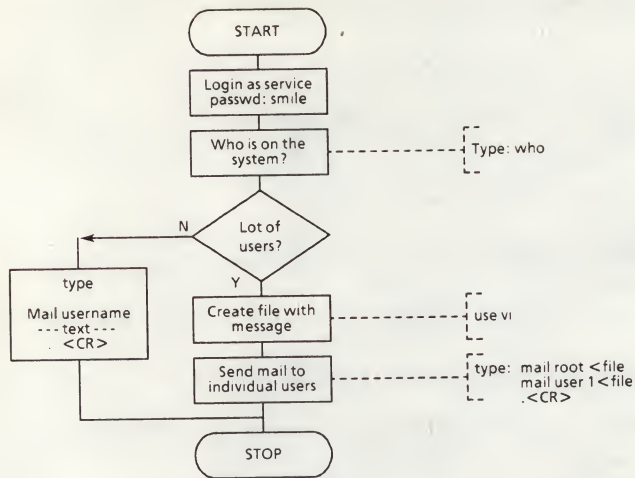
- runlevel (second field) should be **2**, or **23**

- put **'respawn'** in the 'action field' (third field)

The file **/etc/inittab** is write protected, so you must be super user (root) to be able to modify this file.

1.3.2.6 MAIL

Sending Mail:



Reading mail:

Type: **mail** (between jobs, or at login), this will present the contents of the message.

Type: **q** = quits mail. or:

Type: **d** = delete mail (empty mailbox)

See **help** for more options.

NOTES:

1. When sending mail, you cannot be sure when the user will read your mail. It depends on what he/she is doing !
The message "you have mail" may occur when:
 - logging in
 - leaving a command
2. If you want to force a message to the users, use:
write, or (in case of a shutdown) the shutdown message.
3. Mail cannot be blocked by **mesg n**.

1.3.2.3 WHO

The utility **who** tells who is currently on the system. See **help** for options.

When using a wrong command option an error message will be given. In the error message an overview of the available options is given. As example **who -1** will result in such a list.

who am i, gives the: login name; tty port; date and time

1.3.2.4 TTY

The utility **tty** tells the pathname of your terminal.,

For example: **/dev/tty10**

See the utility **help** for options.

1.3.2.5 STTY

The utility **stty** tells or changes the current setting of your terminal.

For example: **speed 9600 baud; -parity**

swtch = ^ ';

brkint -inpck -istrip icrnl onlcr tab3

echo echoe echok

For example: **stty 1200** will change your baudrate to 1200 bits/sec.

stty -echo will cause no echo on your screen

stty echo switches echo on again

See the utility **help** for options.

1.3.2 Unix Procedures

1.3.2.1 Log onto the System as Service

Log-in as: **service**
 or
 service ft45 (when using a ft45 terminal)
 or
 service tm220 (when using a tm220 type terminal)

Password: **smile**

System Profile: **/etc/profile**

User Profile: **.profile** (in the home directory). This file adapts the standard "user environment" to the needs for the individual user.

Activating changes When modifying /etc/profile or .profile the modifications can be made active by logging off and login again.

Some simple UNIX commands:

pwd: Prints working directory, for example:
 /u/service

ls -lia: Prints contents of working directory.

env: lists the shell variables and their values that make up your environment.

exit: Log off from the system and receive a login prompt again.
(or <ctrl d>)

1.3.2.2 HELP

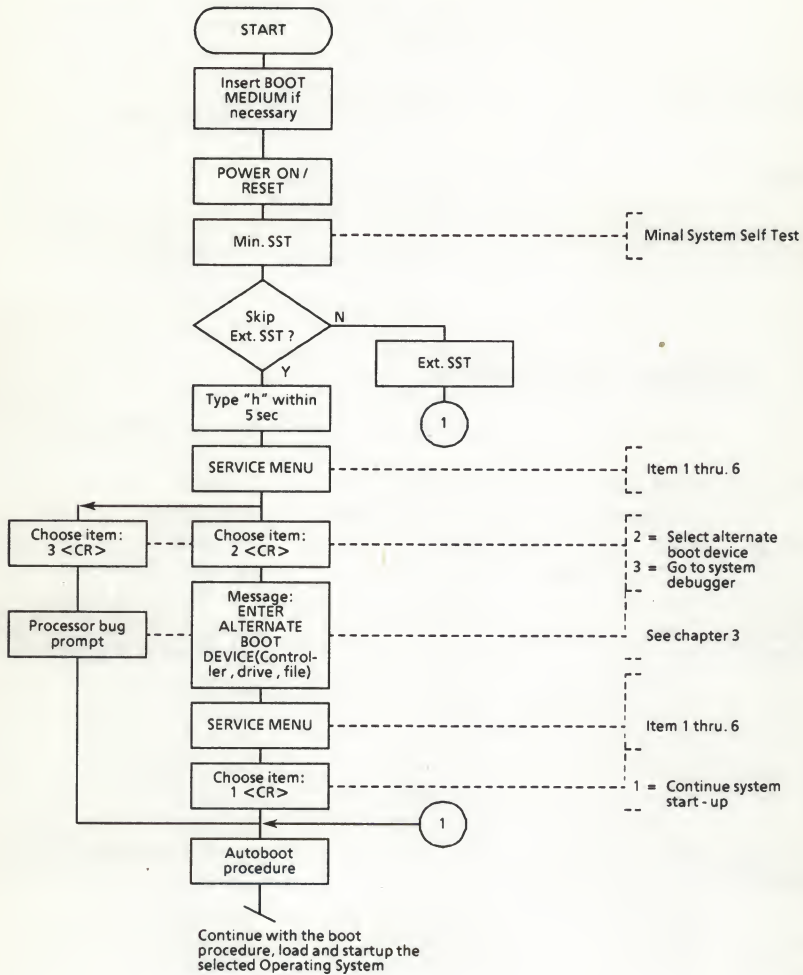
The utility **help** (release R3V5.3 or higher) can be used to learn about UNIX. This utility is easy to use, it presents the following menu:

Choices	Description
s	starter: general information
l	locate: find a command with keywords
u	usage: information about commands
g	glossary: definitions of terms
r	redirect to a file or command
q	quit

Enter choice > enter one of the items mentioned above.

1.3 SYSTEM RELATED INFORMATION

1.3.1 Booting from Alternate Devices



Electrical Specifications

110 VAC nominal 47 Hz - 63 Hz
(90 - 132 VAC tolerance)
10A maximum at 110 VAC
220 VAC nominal 47 Hz - 63 Hz
(180 - 264 VAC tolerance)
5A maximum at 220 VAC

Power Consumption

1100W maximum
785W typical (varies with features)

Heat Produced

3960 Kjoule max.
2820 Kjoule typical

Acoustic Noise

55 dBA maximum

1.2.7 Controller Specifications

Controller	Type	Interface	Transfer Rate (per second)
MVME320A/B	Hard Disk	ST-506	5 Mbits
	Flexible disk	SA-400 / SCSI	250 Kbits
MVME323	ESDI	ESDI	20 Mbits
MVME350	Cartridge Tape	QIC II	Up to 90 Kbits
MVME327A	SCSI Disk	SCSI1	1,5 Mbits to 4 Mbits
MVME327A	Cartridge Tape	SCSI1	Up to 90 Kbits
MVME328	SCSI Disk	SCSI1	1,5 Mbits to 4 Mbits
MVME328	Cartridge Tape	SCSI1	Up to 90 Kbits
MVME355	$\frac{1}{2}$ " 9-Track Tape	Pertec	Up to 1.25 Mbits
MVME332	8-Port Serial	RS-232C	Up to 19.2 Kbits
MVME332XT	8-Port Serial	RS-232C	Up to 19.2 Kbits
MVME335	4-Port Serial	RS-232C	Up to 19.2 Kbits
MVME336	96-Port Serial	RS-232C	Up to 38.4 Kbits
MVME338	256-Port Serial	RS-232C	Up to 38.4 Kbits
MVME333	Communications	RS-232C	Up to 19.2 Kbits
MVME330	Ethernet	CSMA/CD	10 Mbits
MVME374	Ethernet	CSMA/CD	10 Mbits
MVME376	Ethernet	CSMA/CD	10 Mbits

1.2.5 P9070 Enclosure Specifications

Dimensions:

- Height	25.5" (64.77 cm)
- Depth	27.5" (69.85 cm)
- Width	12.5" (31.75 cm)
- Weight	135 lb. (61.2 kg)

Temperature

+5°C to +40°C (operating)
10° C hour max. gradient

-10°C to +60°C (storage)
-40°C to +60°C (transit)

Electrical Specifications

110 VAC nominal 47 Hz - 63 Hz
(90 - 132 VAC tolerance)
220 VAC nominal 47 Hz - 63 Hz
(180 - 264 VAC tolerance)
5A maximum at 110 VAC
2.5A maximum at 220 VAC
Fusing 10A Internal (not user serviceable)

Power Consumption

550W maximum
400W typical (varies with features)

Heat Produced

1900 BTU maximum, 1400 BTU typical

Accoustic Noise

55 dBA maximum

1.2.6 P9090 Enclosure Specifications

Dimensions:

- Height	28.1" (71.37 cm)
- Depth	23.2" (58.92 cm)
- Width	19.0" (48.26 cm)
- Weight (typical)	220 lbs. (100 kg)

Temperature

+5°C to +35°C (operating)
-40°C to +60°C (non-operating)

1.2.3 P9050 Enclosure Specifications

Dimensions:

- Height	21.0" (53.3 cm)
- Depth	17.5" (44.5 cm)
- Width	7.1" (18.0 cm)
- Weight	75 lbs. (34.1 kg)

Temperature	+ 5°C to + 35°C (operating) -40°C to + 60°C (non-operating)
-------------	--

Electrical Specifications	110 Vac nominal 47Hz - 63Hz (90 - 132 Vac tolerance) 220VAC nominal 47Hz - 63Hz (180 - 264 Vac) 4A maximum at 110 Vac 2A maximum at 220 Vac
---------------------------	--

Power Consumption	350W maximum 250W typical (varies with features)
-------------------	---

Heat Produced	1200 BTU max., 770 BTU typical
---------------	--------------------------------

Acoustic Noise	50 dBA maximum
----------------	----------------

1.2.4 P9050/P9045 (Enhanced) Enclosure Specifications

Dimensions:

- Height	22.6" (57.4 cm)
- Depth	19.0" (48.3 cm)
- Width	8.0" (20.3 cm)
- Weight	80 lbs. (36.3 kg)

Temperature	+ 5°C to + 35°C (operating) -40°C to + 60°C (non-operating)
-------------	--

Input Frequency	47Hz to 63Hz
-----------------	--------------

Electrical Specifications	90 to 132 Vac or 180 to 264 Vac 5.6A at 115 Vac 2.8A at 240 Vac
---------------------------	--

Power Consumption	300W maximum or 350W maximum (new power supply)
-------------------	---

Heat Produced	1025 BTU
---------------	----------

Acoustic noise	50 dBA
----------------	--------

1.2 TECHNICAL DATA

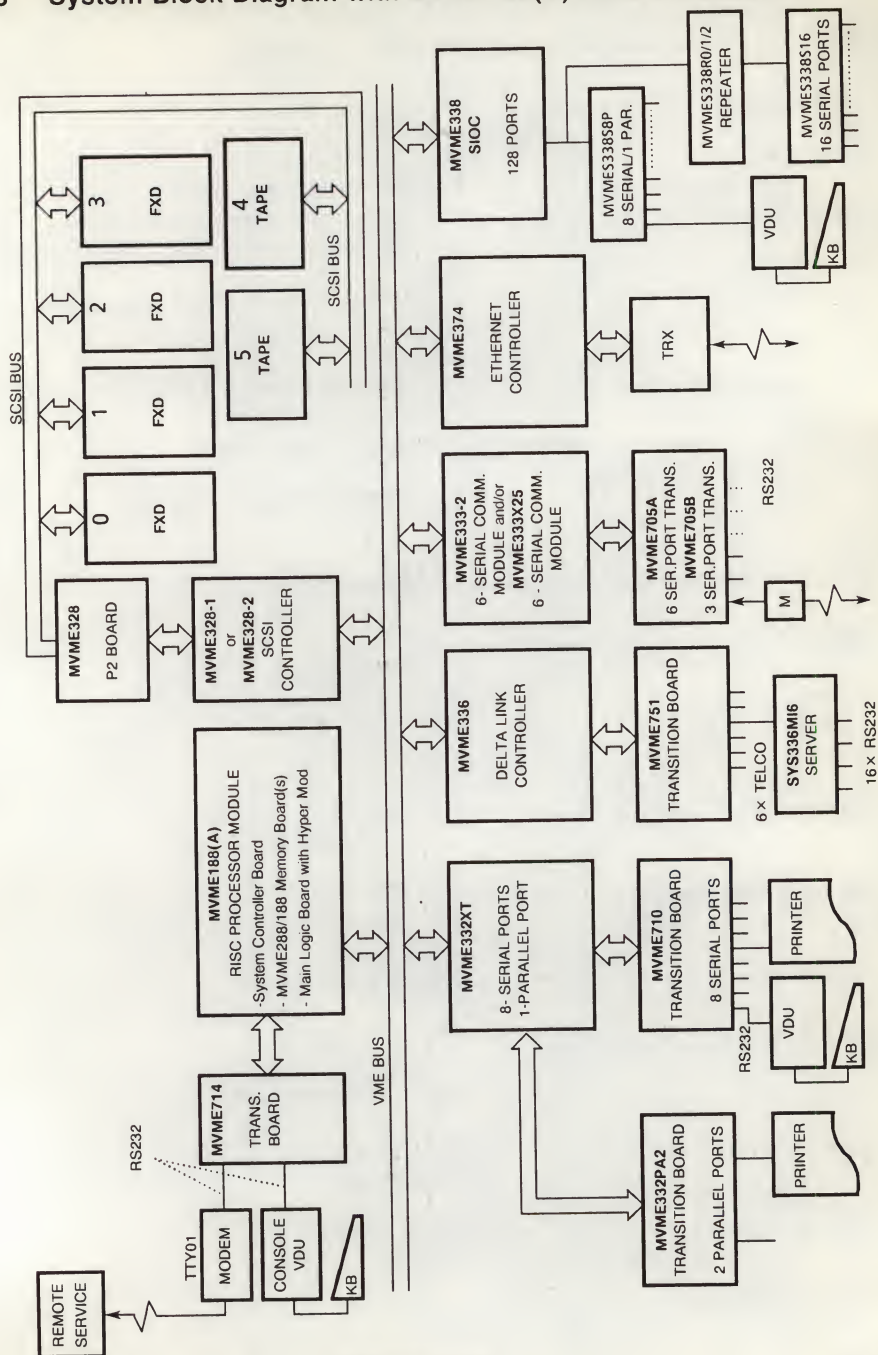
1.2.1 P9000 m-system Specification Summary

Microprocessor	MC68020/MC68030/MC88100
Bus	VME/VSB
Floating Point	IEEE P754 format
Local Area Network (LAN)	Ethernet Version 1 or 802.3
Tape Interfaces	QIC-02 (1/4-inch cartridge tape), SCSI 9-Track Pertec compatible (1/2-inch reel-to-reel tape)
Disk Interfaces	ST-506 5-1/4 inch hard disk drives (67Mb), ESDI 5-1/4-inch hard disk drives (161Mb) SCSI
Operating System	SYSTEM V/68 Release 3 and System V/88 Rel. 3
Network Protocols	TCP/IP, Office LAN, X25
Data Communications Protocols	SNA/SDLC, Bisync, Async
Data Communications Interface	RS-232C
Languages	C, ANSI FORTRAN 77, COBOL

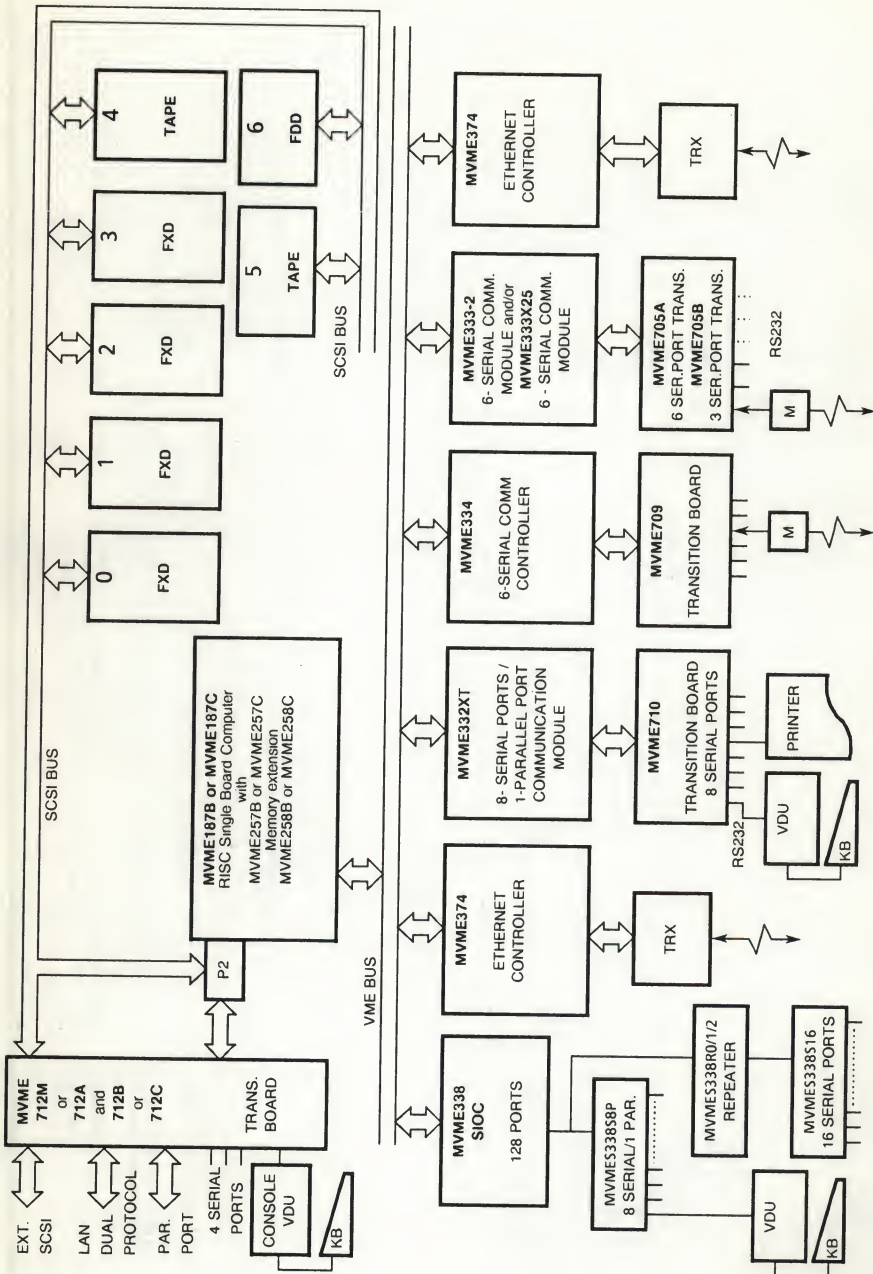
1.2.2 P9030/P9035 Enclosure Specifications

Dimensions:	
- Height	6.4" (16.26 cm)
- Depth	17.0" (43.18 cm)
- Width	17.0" (43.18 cm)
- Weight	45 lbs. (20.5 kg)
Temperature	+ 5°C to + 35°C (operating) -40°C to + 60°C (non-operating)
Electrical Specifications	90 to 132 Vac 180 to 264 Vac
Input Frequency	47Hz to 63Hz
Output Current	+ 5V → 20A + 12V → 5A (8A peak) -12V → 1A (2A peak)
Power Consumption	175W (Continuous) 220W (peak)
Acoustic Noise	45 dBA (max.)

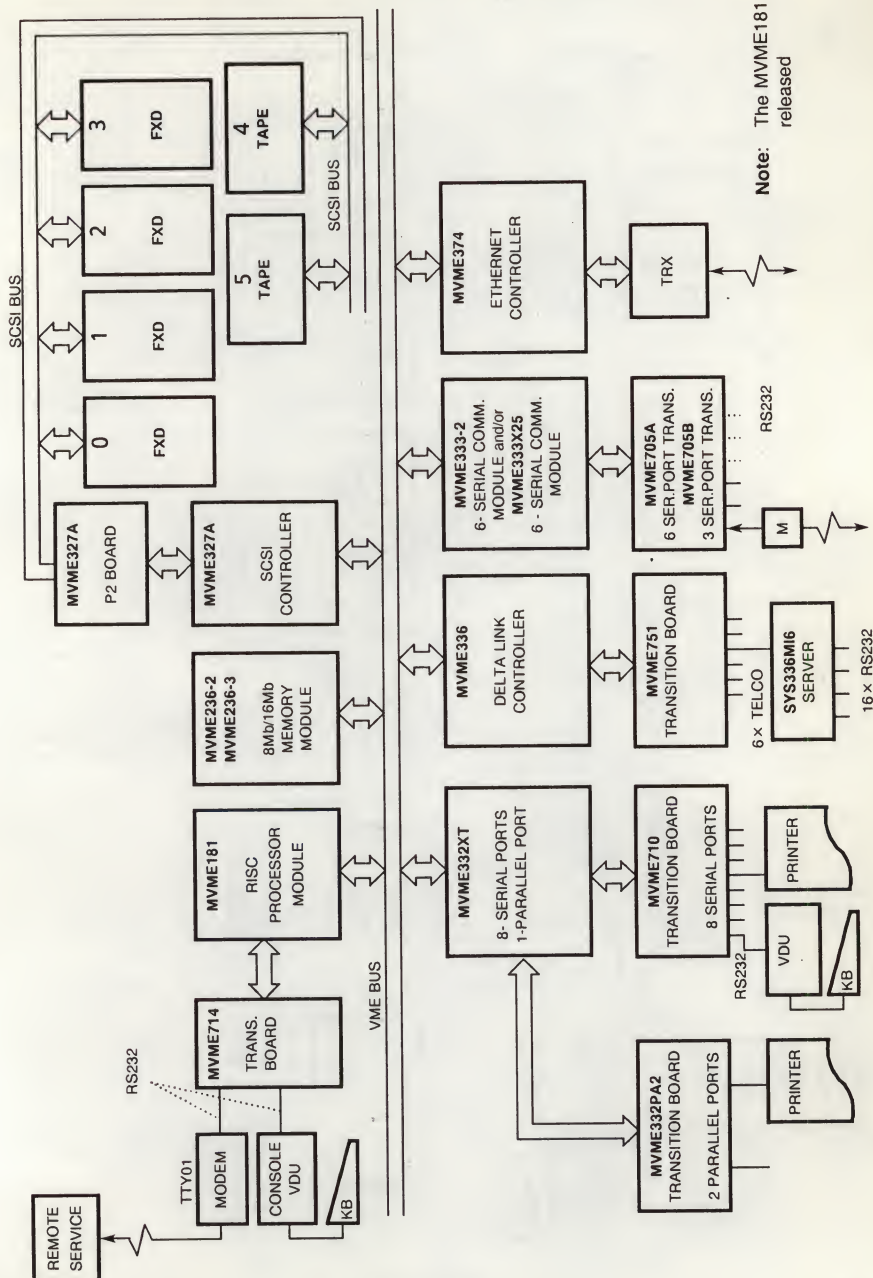
1.1.18 System Block Diagram with MVME188(A) RISC Processor



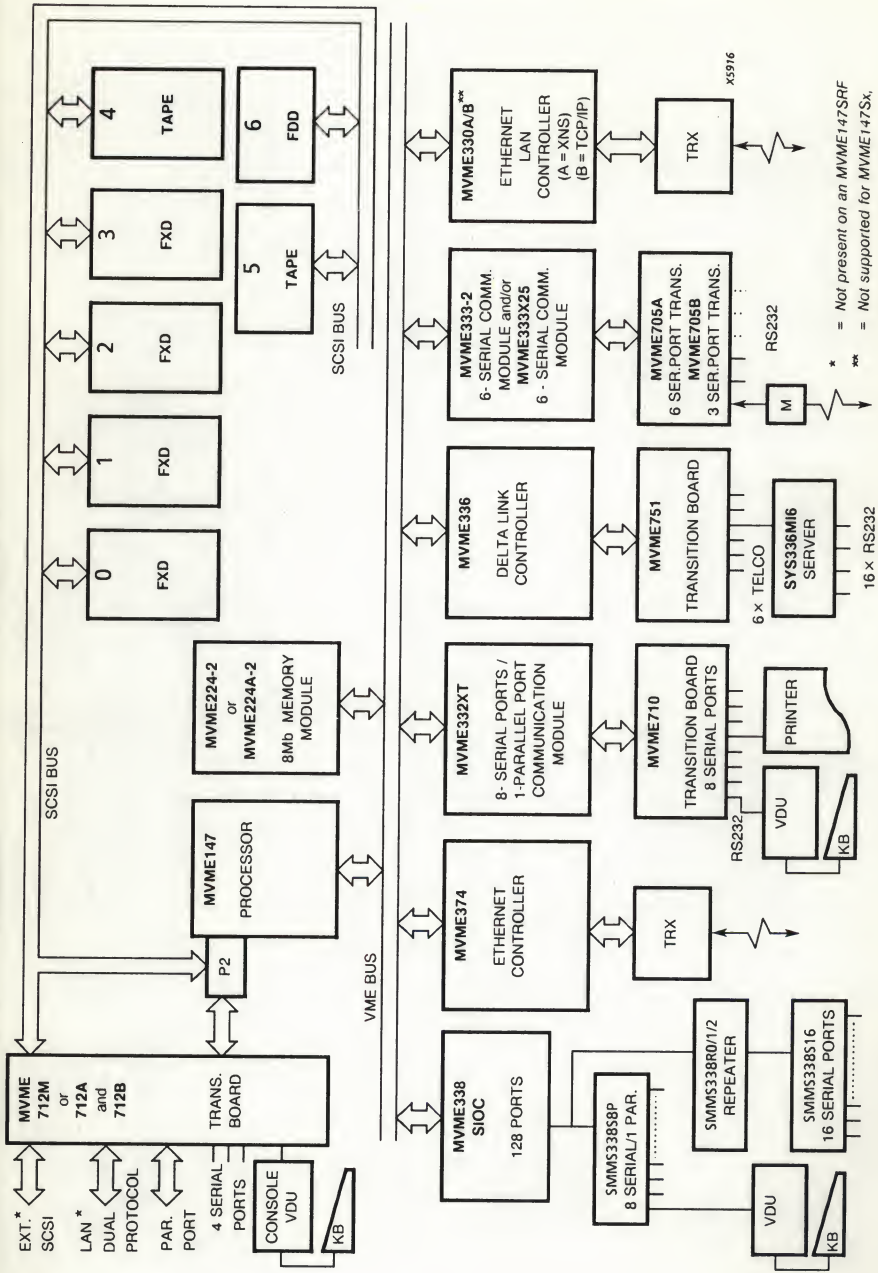
1.1.17 System Block Diagram with MVME187 RISC Processor



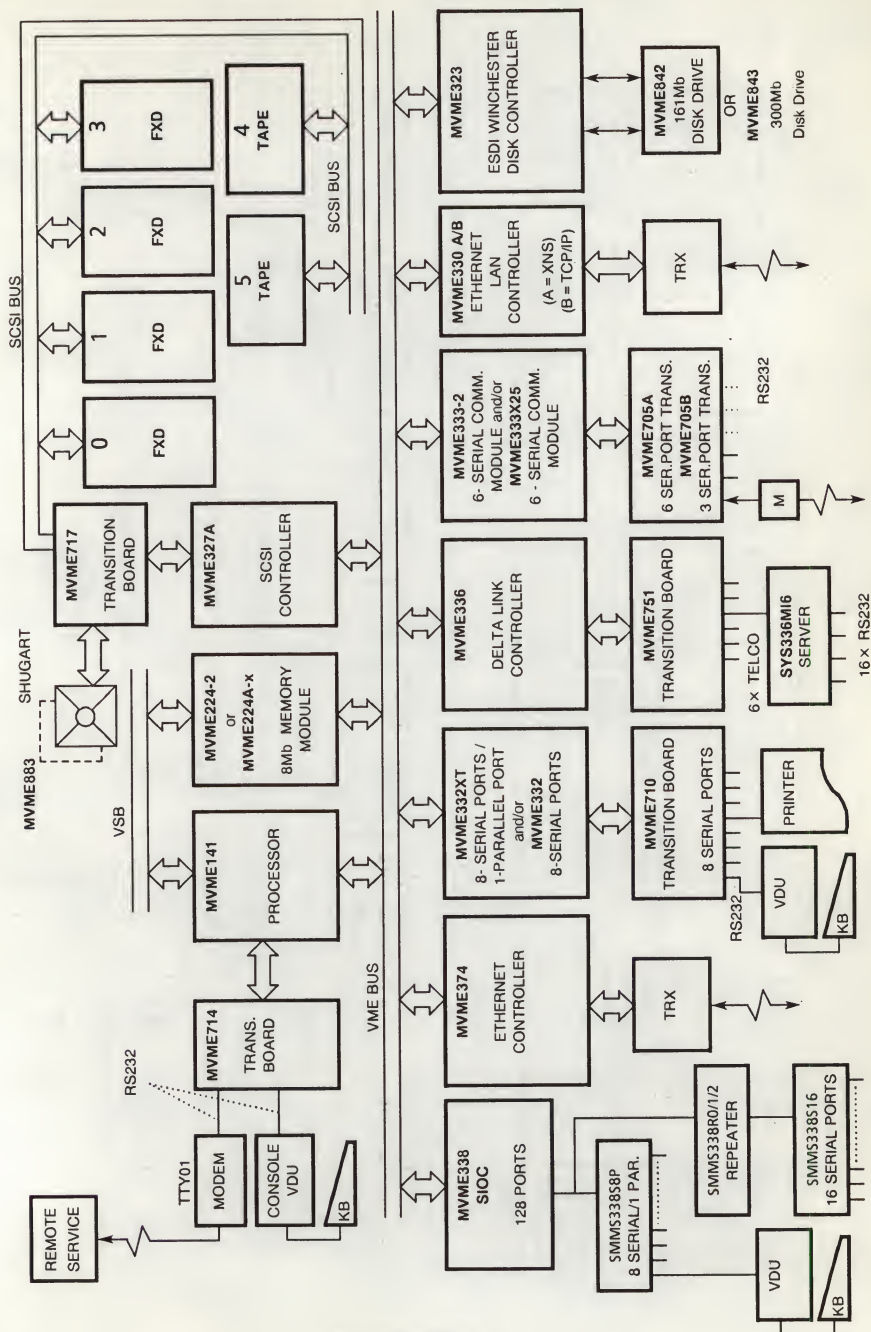
1.1.16 System Block Diagram with MVME181 RISC Processor



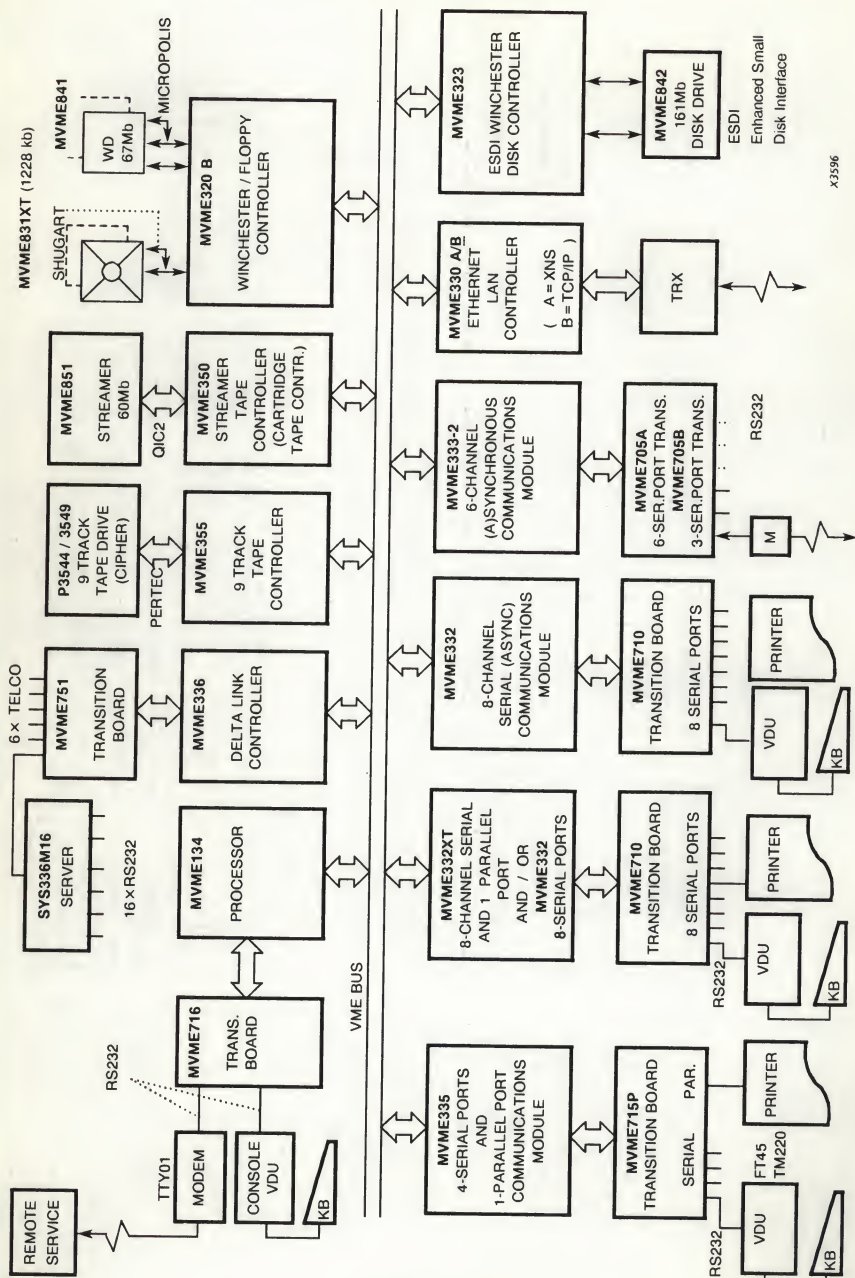
1.1.15 System Block Diagram with MVME147 Processor



1.1.14 System Block Diagram with MVME141 Processor

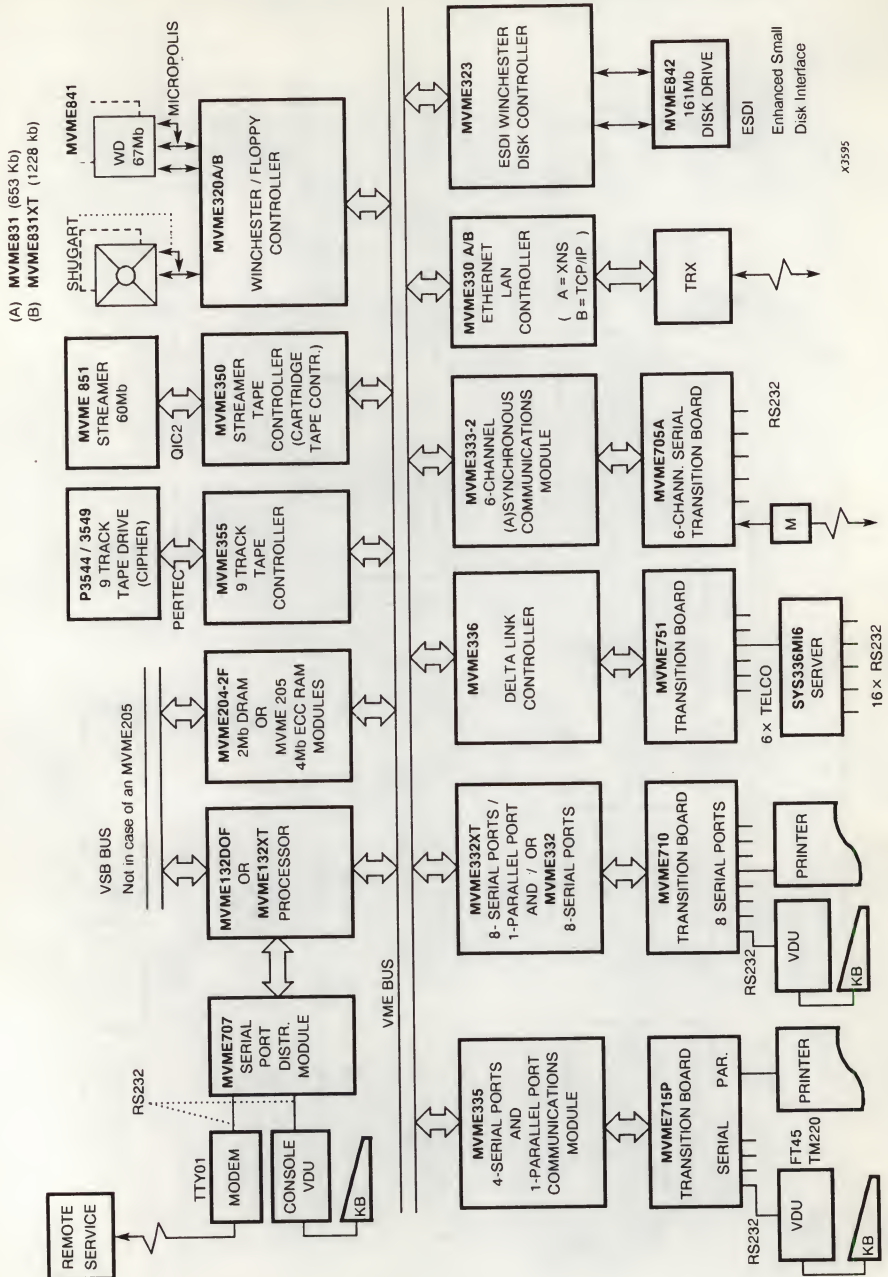


1.1.13 System Block Diagram with MVME134 Processor (only P9050 models)



X3596

1.1.12 System Block Diagram with MVME132DOF/XT Processor



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2.1 HARDWARE INSTALLATION

2.1.1 Installing the System Console

The system console is the terminal from which system administrative functions should be performed. The cable that is used to connect this terminal is the same as for any other terminal; however, the system console cable must be attached to the connector labeled CONSOLE on the transition module belonging to the processor board.

When connecting the system console to the MVME712A transition module it can be necessary to use a conversion cable, converting the DB9 connector layout to DB25 connector layout.

The console should be configured as follows:

- Transmit = 9600 bps
- Receive = Transmit
- XON/XOFF flow control
- XOFF at 128
- 8 data bits, no parity
- 1 stop bit
- No local echo (full-duplex)

Use following procedure to connect system console and power cord to the system.

1. Select an RS-232C cable labeled WORKSTATION/PRINTER. Choose the terminal that is to be the system console. On the back of the terminal, locate the connector for the cable that will connect the terminal to the system. Connect the end of the cable labeled WORKSTATION/PRINTER to this port.

The console cable must be WORKSTATION/PRINTER (DTE to DTE type), Motorola Part Number 30-W2849B01 or equivalent.

2. On the rear of the system, identify the connector labeled CONSOLE. It is located on the right-hand side of the rear panel. Connect the other end of the RS-232C cable (labeled DPU) to this connector.
3. Plug the system's power cord into the input power connector located at the rear of the system on the top left side. When the system installation is finished, plug the other end of the system's power cord into an electrical outlet.
4. Plug the terminal's power cord into the power connector located at the rear of the terminal. When the system installation is finished, plug the other end of the terminal's power cord into an electrical outlet.

CAUTION

Disconnect the power cords for the system and the system console from the electrical outlet before installing the other peripherals. Reconnect the system and the peripherals to an electrical outlet after the entire system is cabled together.

2.1.2 Connecting Terminals

To connect terminals to the system, perform the following steps:

1. Run **sysgen** to check if the Serial I/O Controller is enabled in the kernel.

If not:

- enable the Serial I/O Controller
- built a new kernel
- power down the system
- boot the system

See Chapter 1.3. System Reconfiguration Procedures (sysgen).

2. Run **/etc/portdisplay** to see if the controller was already configured. Check if the transition board of the controller appears on the screen. With an MVME147 or MVME187 processor module the figure of the older MVME712 does appear which uses the DB25 connectors instead of the DB9 connectors.

If portdisplay did not display the current situation, run **/etc/portconfig -m**.

See chapter 1.3, Configuration of Serial I/O Controllers.

3. The RS232 cable must be connected to a free RS232 plug on the transition board at the rear of the system, which one depends on the needs of the customer. For the connections, see also Chapter 15, section belonging to the controller in use. Connect the terminal(s) to the system and the mains, and switch it on.

4. Check the setting of the tty-port via **sysadm modtty**. The state of the tty-port should be **on**, the hang-up delay **off**, and the line setting should be in according to the transfer speed of the connected terminal, oft **9600**.

If necessary change it via the **sysadm modtty**. Activate the new settings via **init q**.

5. Log on to the system as service. (See Chapter 1.3. Log onto the System as Service).

Set the shell variable **TERM** to a correct value, and run a vi-session to check if the terminal is working correct.

2.1.3 Connecting Printers

Serial printer

To connect a serial printer to the system, perform the following steps:

1. Run **sysgen** to check if the Serial I/O controller is enabled in the kernel.

If not:

- enable the Serial I/O Controller
- built a new kernel
- power down the system
- boot the system

See Chapter 1.3, System Reconfiguration Procedures (SYSGEN).

2. Run **/etc/portdisplay** to see if the controller was already configured. Check if the transition board of the Serial I/O Controller appears on the screen.
If not, run **portconfig -m**. See chapter 1.3, Configuration of Serial I/O Controllers.
3. Connect the printer to the system, and to the mains, and switch on the printer. The RS232 cable of the printer should be connected to a free RS232 plug at the rear of the system, which one can depend on the wish of the customer.
4. Check the setting of the tty-port via **sysadm modtty**. The state of the tty-port should be **off**, the hang-up delay **off**, and the line setting should be in according to the transfer speed of the connected printer, oft **9600**.
If necessary change it via the **sysadm modtty**. Activate the new settings via **init q**.
5. Test the connection by sending a small file to the I/O port:
cat file > /dev /tty. .

If the file is not printed, check previous points and check printer settings.
6. Check XON/XOFF protocol by sending a file of at least 10 pages. Check for corrupted data.
7. Configure the printer into the line printer mechanism, using **/etc/lp.cnfg**.
See Chapter 1.3, LP System Configuration Utility (lp.cnfg).
8. Check the line printer configuration with **lpstat -t** and by printing the file **/usr/pub/ascii** with the **lp** command. See chapter 1.3, LP System Configuration Utility (lp.cnfg). The file **/usr/pub/ascii** contains all ascii characters.
Check if they are printed correctly.

Parallel printer

To connect a parallel printer to the system, perform the following steps:

1. Run **sysgen** to check if the controller with the parallel printer port is enabled in the kernel.
If not:
 - enable the Controller
 - built a new kernel
 - power down the system
 - boot the system
 See Chapter 1.3, System Reconfiguration Procedures (SYSGEN).
2. Run **/etc/portdisplay** to see if the controller was already configured. Check if the transition board of the Controller appears on the screen. For the MVME332PA1 and MVME332PA2 there is no picture available.
If not, run **portconfig -m**. See chapter 1.3, Configuration of Serial I/O Controllers.

3. Connect the printer to the system, and to the mains, and switch on the printer. The parallel cable of the printer should be connected to a parallel printer plug at the rear of the system, which one can depend on the wish of the customer. There are different cables to connect a parallel printer, which one you have to use depends on the type of connector present on the system.

4. Test the connection by sending a small file to the I/O port:

cat file > /dev /portname

The **portname** depends on the controller in use, parallel printer controllers with their device names are:

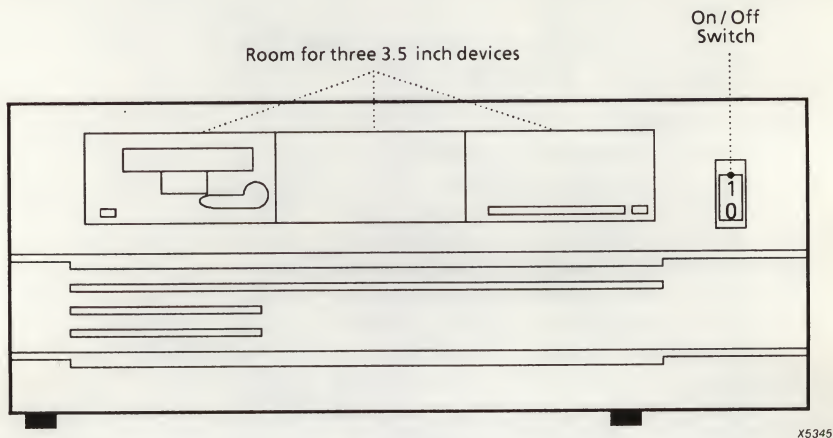
MVME147 processor	/dev/lp147
MVME187 processor	/dev/lpc2
MVME332XT card 1	/dev/m332xt08
MVME332XT card 2	/dev/m332xt18
MVME332XT card 3	/dev/m332xt28
MVME332XT card 4	/dev/m332xt38
MVME332XT card 5	/dev/m332xt48
MVME332XT card 6	/dev/m332xt58
MVME332XT card 7	/dev/m332xt68
MVME332XT card 8	/dev/m332xt78
MVME335 card 1	/dev/lp335__1
MVME335 card 2	/dev/lp335__2

If the file is not printed, check previous points and check printer settings.

5. Configure the printer into the line printer mechanism, using **/etc/lp.cnfg**.
See Chapter 1.3, LP System Configuration Utility (lp.cnfg).
8. Check the line printer configuration with **lpstat -t** and by printing the file **/usr/pub/ascii** with the **lp** command. See chapter 1, LP System Configuration Utility (lp.cnfg). The file **/usr/pub/ascii** contains all ascii characters.
Check if they are printed correctly.

2.2 P9030/P9035 installation

Report any damage on the receipt of the shipment on the installation report.



Front view P9030/P9035

After unpacking and putting the system on its place the terminal(s), printer(s) can be connected, and the system can be connected to the mains. Power up the system and press in the first 5 seconds the 'h' to stop the start up procedure and to come in the processor bug. The P9030 is equipped with an MVME147 processor module which requires a setup, execute the processor bug command env.

Via the bug command iot;t the SCSI mass storage devices has to be configured.

The P9035 is equipped with an MVME187 RISC Single Board Computer which also needs a setup via the bug command env.

Test the total system with the aid of the Standalone System Interactive Diagnostic programs.

If it is necessary to reinstall the UNIX operating system, use the Software Release Guide to reinstall the software.

After starting up the system in UNIX the customer (system administrator) has to prepare the system in according to his needs.

2.2.1 Adding/removing an MVME module

When working on the P9030/P9035 cabinet and/or MVME boards you have to follow the Electrical Static Discharge rules.

Do not remove or insert modules, cables, disk drives or other assemblies while power is applied, this can result in damage of the equipment.

Removing the covers

The front cover can be removed by grasping the corners and then pulling the cover off. Remove the top cover by loosening the three screws at the front edge, grasping the front edge, lifting and moving the top back until the cover is removed.

Adding an MVME module

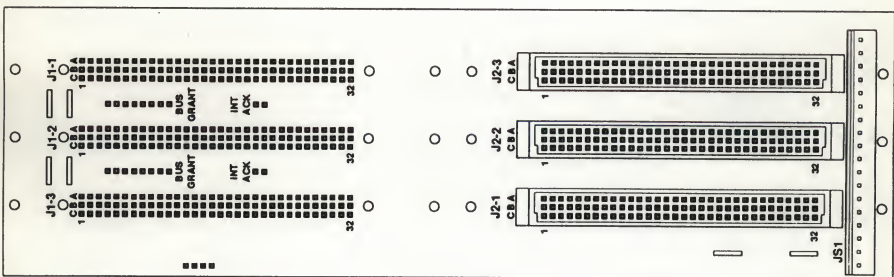
The metal plate, covering the card slot, has to be removed, keep this plate because it is needed again when removing an MVME module from the card rack.

When inserting an MVME module into an MVME card rack the module has to be strapped in according to the specifications given in the chapter describing the module.

When installing an MVME module into the card rack the Bus Grant In (BGxIN) and Bus Grant Out (BGxOUT) daisy chain jumpers and the Interrupt Acknowledge (IACK) strap have to be taken out. These straps are for the P9030/P9035 cabinet located on the rear of the backplane, see figure.

Slide the MVME module into the card rack, align it into the card slot and push it (firmly at both sides) into the connector until it is seated.

Fasten the screws which are securing the module in the card rack and which are giving a good ground connection. Do not fasten the screws to much. To many MVME modules are returned to the workshop with damaged screws



Transition Module

Some MVME modules go together with a Transition Module which has to be mounted at the rear of the cabinet. Remove the metal plate covering the slot for the Transition Module and slide the Transition Module into place. Secure it with the screws into the cabinet.

Make the connections from the Transition Module to the P2 connector (used by the belonging MVME module) at the rear of the backplane.

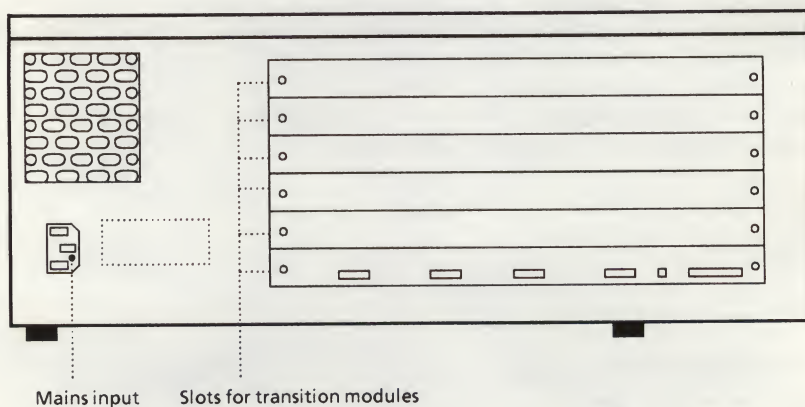
When removing a Transition Module, store it in an anti static bag or box, remove the belonging cable(s), and reinstall the metal plate to close the hole in the rear of the cabinet.

Removing an MVME module

When removing an MVME module from the card rack, loosening the screws which secures the module into the card rack, take the module out and store it in an anti static bag or box. Remove the cabling and Transition Module belonging to the removed MVME module.

Reinstall the BGxIN, BGxOUT and IACK jumpers on the rear of the backplane.

Reinstall the metal plate covering the empty card slot to secure a good air flow inside the cabinet.



Rear view of the P9030/P9035

Remove a disk or tape

To remove a disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the front cover and top cover.
- Identify, mark, and remove all cables connected to the drive(s) to be removed
- Loosen the two screws in the upper chassis member, above the drive(s) to be replaced.
- Carefully slide the drive(s) toward the front of the chassis.
- Remove the two peripheral brackets (right and left) from the drive(s) and store them for later use.
- When not installing another devices instead of the removed one, install a drive filler bracket to close the gap created by the removed device. Tighten the screws in the upper chasis member.

NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

- Replace the covers, power cord and test the system.

Adding a disk or tape

Only half height SCSI devices can be installed in the system. There is room for a maximum of three 3.5 inch devices or one 5.25 inch (MVME853 or MVME854 streamer device) plus one 3.5 inch disk device.

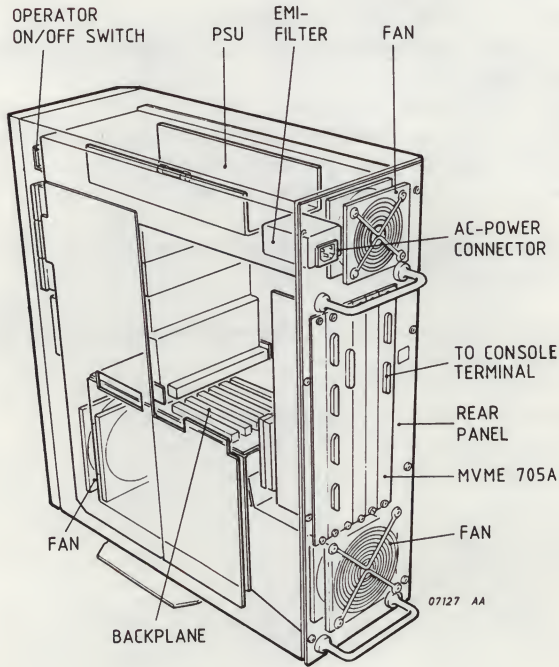
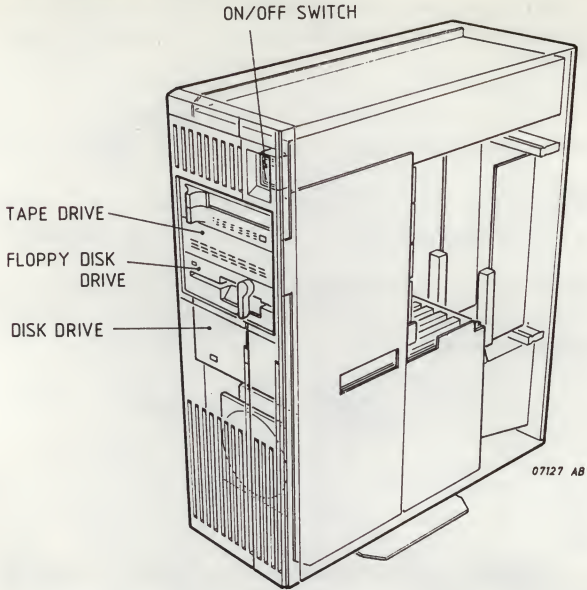
To add a disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the front cover and top cover.
- Remove, if necessary the drive filler bracket by loosening the two screws in the upper chassis member and sliding it out to the front.
- Install the two peripheral brackets (right and left).

NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

- Carefully slide the device with the peripheral brackets into the drive location and lock it via the two screws.
- Connect the cables to the drive.
- Replace the covers, power cord and test the system.

2.3 P9050 installation (old cabinet)



Report any damage on the receipt of the shipment on the installation report.

After unpacking and putting the system on its place the terminal(s), printer(s) can be connected, and the system can be connected to the mains. Power up the system and press in the first 5 seconds the 'h' to stop the start up procedure and to come in the processor bug. If the P9050 is equipped with an MVME141 or MVME147 processor module which requires a setup, execute the processor bug command **env**.

Via the bug command **iot**; the SCSI mass storage devices has to be configured.

Test the total system with the aid of the Standalone System Interactive Diagnostic programs.

If it is necessary to reinstall the UNIX operating system, use the Software Release Guide to reinstall the software.

After starting up the system in UNIX the customer (system administrator) has to prepare the system in according to his needs.

2.3.1 Adding/removing an MVME module

When working on the P9050 cabinet and/or MVME boards you have to follow the Electronical Static Discharge rules.

Do not remove or insert modules, cables, disk drives or other assemblies while power is applied, this can result in damage of the equipment.

Removing the cover

- Since all of the cables will have to be removed from the rear of the sytem cabinet, make sure they are properly marked for reconnection. Remove all of the cables from the rear of the system.
- Unfasten the eight fasteners from the rear of the system.
- Gently move the system so it is resting on the rear panel (on the handles). Pull upward on the shroud until the system is uncovered. Take care not to damage any internal cabling. Gently move the unit upright so as to have access to the area needed.

Access to the MVME card rack

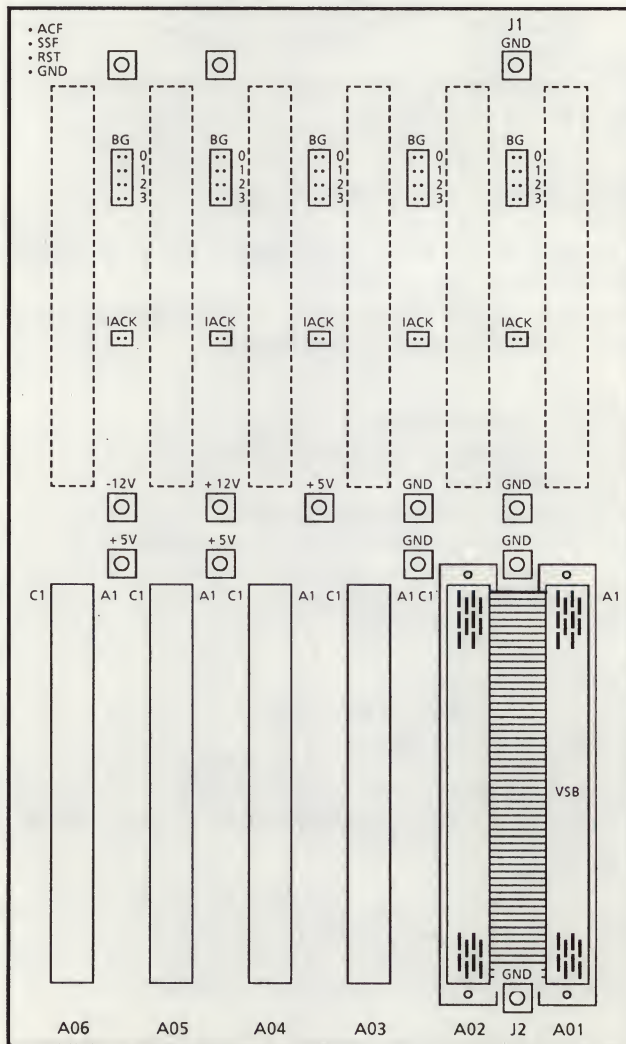
When only an MVME card has to be interchanged it is not necessary to remove the cover, in such a case proceed as follows:

- Gently move the system so it is up side down, take care not to damage any cabling. Remove the cabling if necessary. Unfasten the screw which locks the bottom plate and remove the plate. Now you have access to the MVME modules.

Adding an MVME module

- Remove the metal plate, covering the card slot. Store this plate because it is needed again when removing an MVME module from the card rack.
- When inserting an MVME module into the MVME card rack the module has to be strapped in according to the specifications given in the chapter describing the module.

- When installing an MVME module into the card rack the Bus Grant In (BGxIN) and Bus Grant Out (BGxOUT) daisy chain jumpers and the Interrupt Acknowledge (IACK) strap have to be taken out. These straps are for the old P9050 cabinet located on the front of the backplane, see figure.
- Slide the MVME module into the card rack, aligning it into the card slot and push it in (firmly at both sides) into the connector until it is seated.
- Fasten the screws which are securing the module in the card rack and which are giving a good ground connection. Do not fasten the screws too much. Too many MVME modules are returned to the workshop with damaged screws



Transition Module

Some MVME modules go together with a Transition Module which has to be mounted at the rear of the cabinet.

- Remove the metal plate covering the slot for the Transition Module and slide the Transition Module into place. Secure it with the screws into the cabinet.
- Make the connections from the Transition Module to the P2 connector (used by the belonging MVME module) at the rear of the backplane.
- When removing a Transition Module, store it in an anti static bag or box, remove the belonging cable(s), and reinstall the metal plate to close the hole in the rear of the cabinet.

Removing an MVME module

- When removing an MVME module from the card rack, loosening the screws which secures the module into the card rack, take the module out and store it in an anti static bag or box.
- Remove the cabling and Transition Module belonging to the removed MVME module.
- Reinstall the BGxIN, BGxOUT and IACK jumpers on the front of the backplane.
- Reinstall the metal plate covering the empty card slot to secure a good air flow inside the cabinet.

Remove a disk or tape

To remove a disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the cover, see above.
- Identify, mark, and remove all cables connected to the drive(s) to be removed
- Loosen the four screws in the side plate of the chassis, holding the drive(s) to be replaced.
- Carefully slide the drive(s) toward the front of the chassis.
- Remove the two peripheral brackets (right and left) from the drive(s) and store them for later use.
- When not installing another device instead of the removed one, install a drive filler bracket to close the gap created by the removed device.

NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

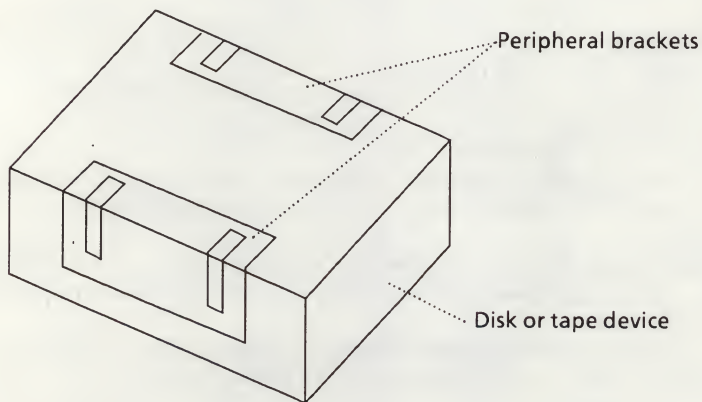
- Replace the cover, cables and test the system.

Adding a disk or tape

Only one full height disk drive can be installed in the system. Further on, there is room for one full height or two half height devices with removable media.

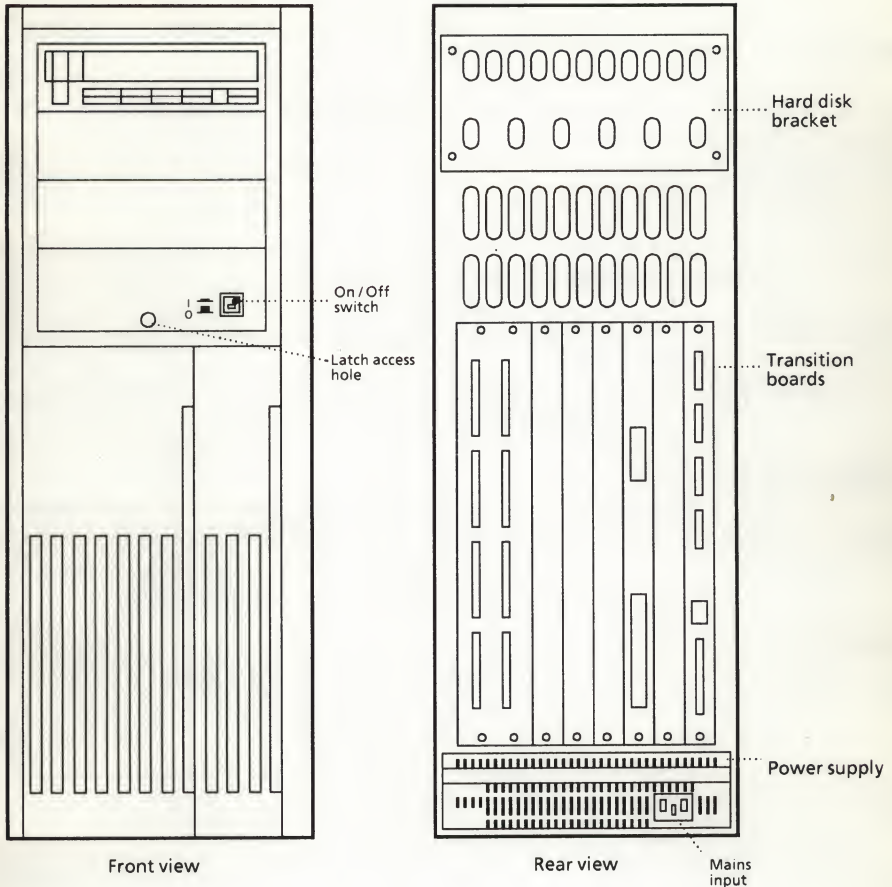
To add a disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the cover, see above.
- Remove, if necessary, the drive filler bracket by loosening the four screws holding it in place, retain the screws.
- Install the two peripheral brackets (right and left), see the figure.



NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

- Carefully slide the device with the peripheral brackets into the drive location and lock it via the four screws.
- Connect the cables to the drive.
- Replace the cover, cables and test the system.



Report any damage on the receipt of the shipment on the installation report.

After unpacking and putting the system on its place the terminal(s), printer(s) can be connected, and the system can be connected to the mains. Power up the system and press in the first 5 seconds the 'h' to stop the start up procedure and to come in the processor bug. If the P9050 is equipped with an MVME141; MVME147; MVME187 or

MVME188(A) processor module which requires a setup, execute the processor bug command env.

Via the bug command iot; the SCSI mass storage devices has to be configured.

Test the total system with the aid of the Standalone System Interactive Diagnostic programs.

If it is necessary to reinstall the UNIX operating system, use the Software Release Guide to reinstall the software.

After starting up the system in UNIX the customer (system administrator) has to prepare the system in according to his needs.

2.4.1 Adding/removing an MVME module

When working on the P9045/P9050 cabinet and/or MVME boards you have to follow the Electronical Static Discharge rules.

Do not remove or insert modules, cables, disk drives or other assemblies while power is applied, this can result in damage of the equipment.

Removing the front cover

- Remove the front cover by inserting a Phillips screwdriver in the front panel hole (see figure) and turn it approximately four turns counterclockwise to release the front cover.
- Pop the top of the front cover forward and lift it away from the cabinet.

Removing the side cover

- Remove the right side cover by pulling the side forward, then tilting the top away from the system cabinet and lifting.
- Remove the air duct cover plate by loosening the four screws and lifting the plate off.

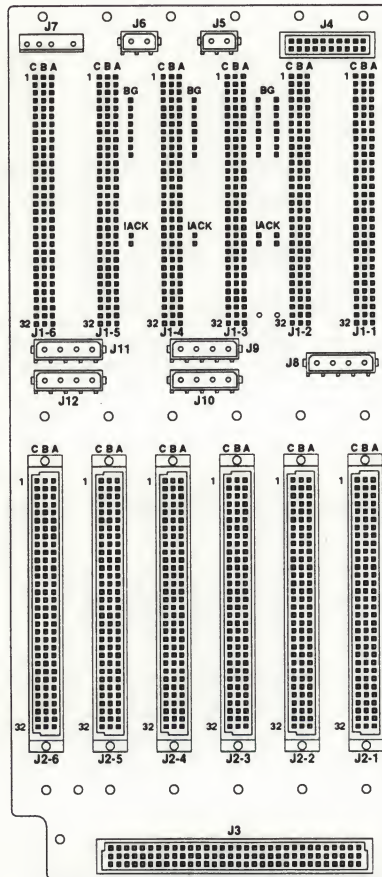
Replacing the front cover

- Replace the air duct cover plate and side cover first.
- Replace the front cover at the bottom first. Snap the cover in place at the top. Turn the latch screw clockwise until it moderately resists.

Adding an MVME module

- Remove the covers, see above.
- When inserting an MVME module into the MVME card rack the module has to be strapped in according to the specifications given in the chapter describing the module.
- When installing an MVME module into the card rack the Bus Grant In (BGxIN) and Bus Grant Out (BGxOUT) daisy chain jumpers and the Interrupt Acknowledge (IACK) strap have to be taken out. These straps are for the P9045/P9050 cabinet located on the rear of the backplane, see figure below.

- Slide the MVME module into the card rack, aligning it into the card slot and push it (firmly at both sides) into the connector until it is seated.
- Fasten the screws which are securing the module in the card rack and which are giving a good ground connection. Do not fasten the screws too much. Too many MVME modules are returned to the workshop with damaged screws



Transition Module

Some MVME modules go together with a Transition Module which has to be mounted at the rear of the cabinet.

- Remove the covers.
- Remove the metal plate covering the slot for the Transition Module and slide the Transition Module into place. Secure it with the screws into the cabinet.
- Make the connections from the Transition Module to the P2 connector (used by the belonging MVME module) at the rear of the backplane.
- When removing a Transition Module, store it in an anti static bag or box, remove the belonging cable(s), and reinstall the metal plate to close the hole in the rear of the cabinet.
- Replace the covers and test the system.

Removing an MVME module

- Remove the covers.
- When removing an MVME module from the card rack, loosening the screws which secures the module into the card rack, take the module out and store it in an anti static bag or box.
- Remove the cabling and Transition Module belonging to the removed MVME module.
- Reinstall the BGxIN, BGxOUT and IACK jumpers on the rear of the backplane.
- Reinstall the metal plate covering the empty card slot to secure a good air flow inside the cabinet, and reinstall the covers. Test the system.

Remove a disk or tape

To remove a disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the covers, see above.
- Identify, mark, and remove all cables connected to the drive(s) to be removed.
- For the front drives, remove the screws on either side of the drive and pull the drive out of the chassis.
Remove the screws connecting the drive mount brackets, on either side of the drive, from the drive.
- For rear mounted devices, remove the four screws securing the hard disk bracket, at the top rear of the cabinet, and slide it out of the chassis.
Remove the screws connecting the hard disk bracket to the drive.

NOTE If this is a permanent removal, ensure that the remaining drive identifications are correct and the terminating resistors are properly installed.

- Replace the covers and test the system.

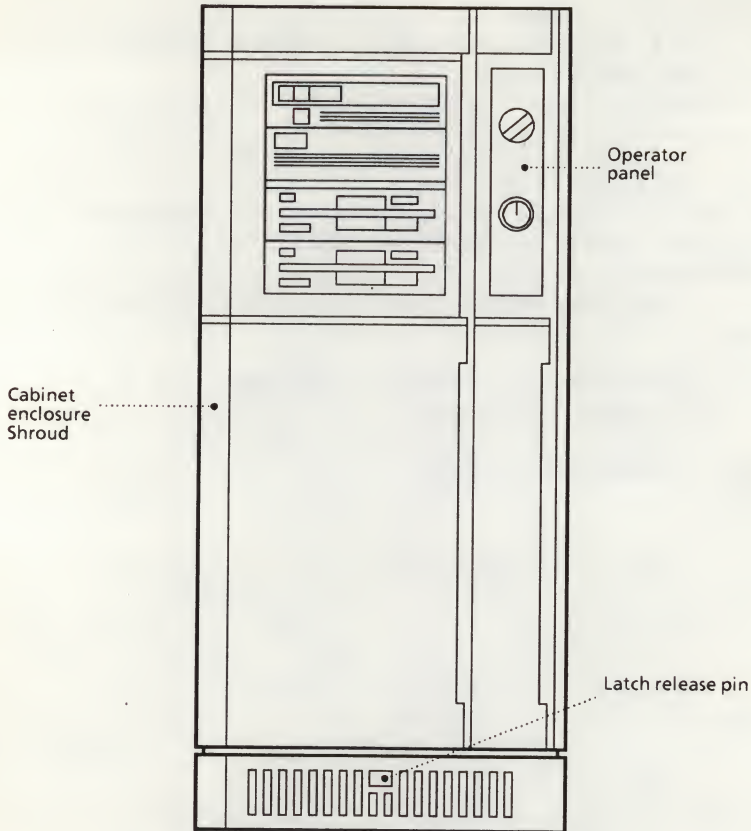
Adding a disk or tape

To add a disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the covers, see above.
- Prepare the drive, see the particular chapter in this book. Mount the drive mount brackets at either side of the drive.
- For the front drives, remove, if necessary the drive filler bracket by loosening the four screws holding it in place, retain the screws.
Slide the drive into position and secure it with the screws at either end and connect the cables to the drive.
- For the rear mounted drives, remove the four screws securing the hard disk bracket, at the top rear of the cabinet, and slide it out of the chassis. Mount the drive to the hard disk bracket.
Slide the hard disk bracket with the drives into the chassis and connect the cables to the drive(s).

NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

- Replace the covers and test the system.



Report any damage on the receipt of the shipment on the installation report.

After unpacking and putting the system on its place the terminal(s), printer(s) can be connected, and the system can be connected to the mains. Power up the system and press in the first 5 seconds the 'h' to stop the start up procedure and to come in the processor bug. If the P9070 is equipped with an MVME141; MVME147 or MVME188(A) processor module which requires a setup, execute the processor bug command **env**. Via the bug command **iot;t** the SCSI mass storage devices has to be configured.

Test the total system with the aid of the Standalone System Interactive Diagnostic programs.

If it is necessary to reinstall the UNIX operating system, use the Software Release Guide to reinstall the software.

After starting up the system in UNIX the customer (system administrator) has to prepare the system in according to his needs.

2.5.1 Adding/removing an MVME module

When working on the P9070 cabinet and/or MVME boards you have to follow the Electrical Static Discharge rules.

Do not remove or insert modules, cables, disk drives or other assemblies while power is applied, this can result in damage of the equipment.

Removing cover

- To remove the shroud, the cover, insert a screwdriver into the slot at the bottom center front of the shroud. Push up the latch release pin and pull the shroud forward until it is removed.
Take care not to damage any internal cabling.
- Remove the cable cover from the front of the card cage by sliding the cover up then pull the bottom away from the system and slide it down.

Replacing cover

- Replace the cable cover in front of the card cage.
- Replace the shroud, guide the lower right and left slides in the guides of the chassis and slide the shroud gently onto the system chassis.
Take care not to damage any internal cabling.

Adding an MVME module

- Remove the covers, see above.
- Remove the metal plate covering the card slot to be used by the MVME module. Store this plate for later use.
- When inserting an MVME module into the MVME card rack the module has to be strapped in according to the specifications given in the chapter describing the module.
- When installing an MVME module into the card rack the Bus Grant In (BGxIN) and Bus Grant Out (BGxOUT) daisy chain jumpers and the Interrupt Acknowledge (IACK) strap have to be taken out. These jumpers are for the P9070 cabinet located on the rear of the backplane.
- Slide the MVME module into the card rack, align it into the card slot and push it (firmly at both sides) into the connector until it is seated.
- Fasten the screws which are securing the module in the card rack and which are giving a good ground connection. Do not fasten the screws too much. To many MVME modules are returned to the workshop with damaged screws

Transition Module

Some MVME modules go together with a Transition Module which has to be mounted at the rear of the cabinet.

- Remove the covers.
- Remove the metal plate covering the slot for the Transition Module and slide the Transition Module into place. Secure it with the screws into the cabinet.
- Make the connections from the Transition Module to the P2 connector (used by the belonging MVME module) at the rear of the backplane.
- When removing a Transition Module, store it in an anti static bag or box, remove the belonging cable(s), and reinstall the metal plate to close the hole in the rear of the cabinet.
- Replace the covers and test the system.

Removing an MVME module

- Remove the covers.
- When removing an MVME module from the card rack, loosening the screws which secures the module into the card rack, take the module out and store it in an anti static bag or box.
- Remove the cabling and Transition Module belonging to the removed MVME module.
- Reinstall the BGxIN, BGxOUT and IACK jumpers on the rear of the backplane.
- Reinstall the metal plate covering the empty card slot to secure a good air flow inside the cabinet, and reinstall the covers. Test the system.

Remove a flexible disk or tape

To remove a flexible disk or tape device from the upper part of the chassis proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
 - Follow the ESD rules.
 - Remove the shroud, see above.
 - Identify, mark, and remove all cables connected to the drive(s) to be removed.
 - Loosening the screws on either side of the drive and pull the drive out of the chassis. There are different mounting ways, all do have two screws at the front used to lock the device into position.
- Remove the drive mount brackets and retain them for later use.

NOTE If this is a permanent removal, ensure that the remaining drive identifications are correct and the terminating resistors are properly installed.

- Replace the shroud and test the system.

Remove a disk

To remove a disk device from the chassis proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the shroud, see above.
- Identify, mark, and remove all cables connected to the drive(s) to be removed.
- Loosening the screws on either side of the drive and pull the drive out of the chassis. There are different mounting ways, in the older chassis there are two screws at the front used to lock the device into position. On newer chassis the drives are mounted into the chassis via four screws between the side plates. Remove the drive mount brackets and retain them for later use.

NOTE If this is a permanent removal, ensure that the remaining drive identifications are correct and the terminating resistors are properly installed.

- Replace the shroud and test the system.

Adding a flexible disk or tape

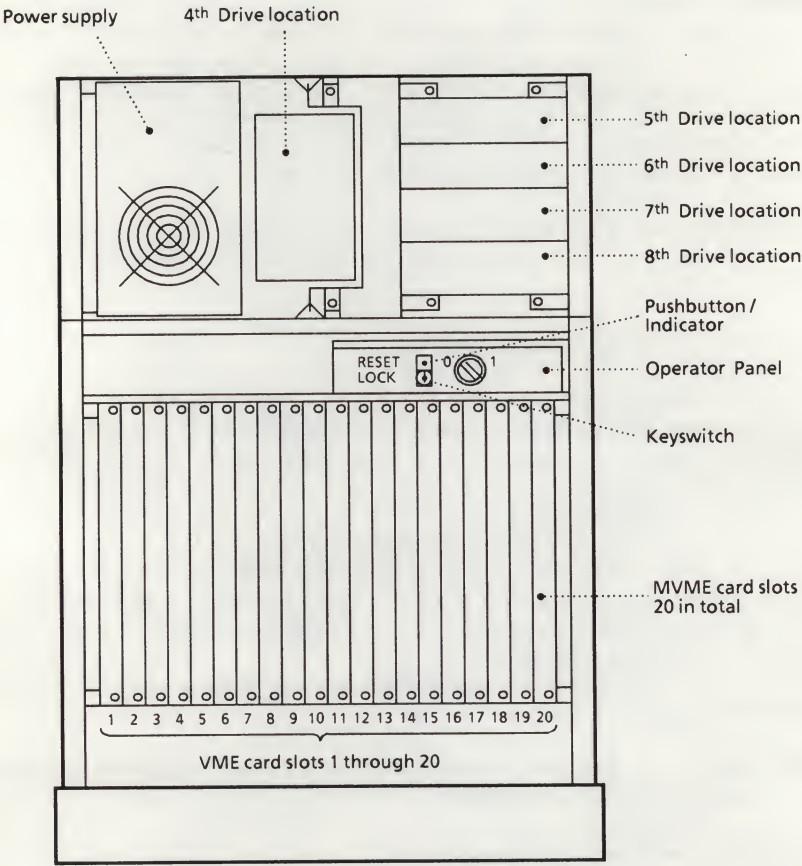
To add a flexible disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the covers, see above.
- Prepare the drive, see the particular chapter in this book.
- Mount the drive to the drive mounting bracket(s), there are different mounting materials depending on the type of P9070 chassis. Older chassis do need the cradle assembly, newer chassis do not use mounting brackets the drives are mounted between the side plates. Slide the drive into position and secure it with the screws at either end and connect the cables to the drive.

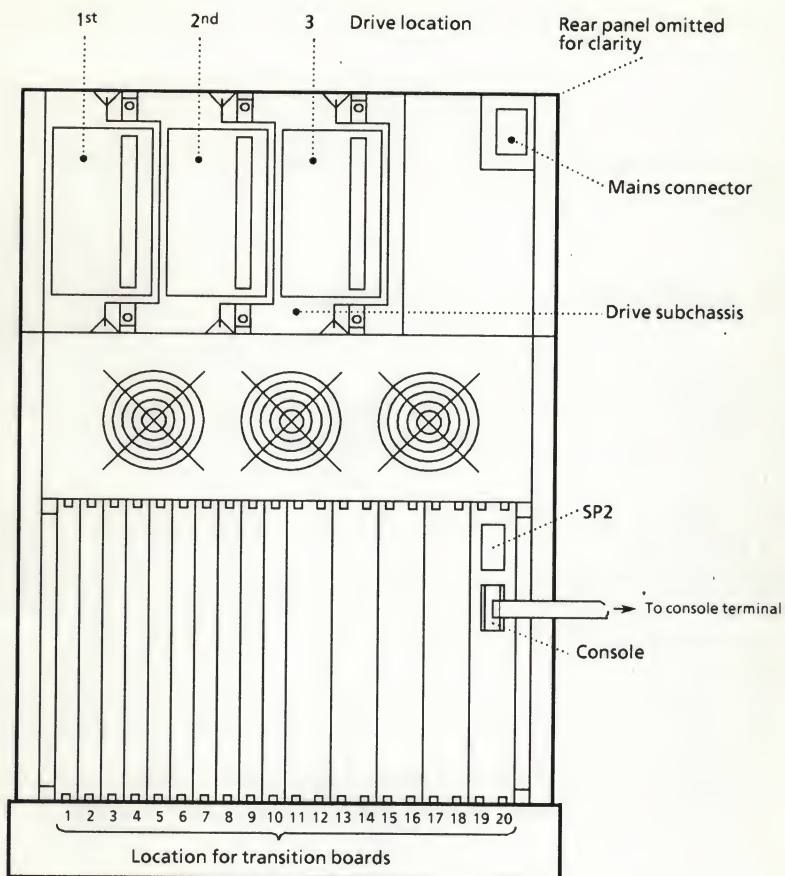
NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

- Replace the covers and test the system.

2.6 P9090 installation



P9090 Front view
Covers removed



P9090 Rear view
Covers removed

Report any damage on the receipt of the shipment on the installation report.

After unpacking and putting the system on its place the terminal(s), printer(s) can be connected, and the system can be connected to the mains. Power up the system and press in the first 5 seconds the 'h' to stop the start up procedure and to come in the processor bug. If the P9090 is equipped with an MVME141 or MVME188(A) processor module which requires a setup, execute the processor bug command **env**.

Via the bug command **lot**, the SCSI mass storage devices has to be configured.

Test the total system with the aid of the Standalone System Interactive Diagnostic programs.

If it is necessary to reinstall the UNIX operating system, use the Software Release Guide to reinstall the software.

After starting up the system in UNIX the customer (system administrator) has to prepare the system in according to his needs.

2.6.1 Adding/removing an MVME module

When working on the P9090 cabinet and/or MVME boards you have to follow the Electrical Static Discharge rules.

Do not remove or insert modules, cables, disk drives or other assemblies while power is applied, this can result in damage of the equipment.

Removing covers

- Ensure that chassis power is OFF, and that the power cord is disconnected from the AC source.
- Remove the top and the right and left skins, and bezel from the enclosure. The skins and bezel are held on by ball pop-on-pop-off catches. Remove the skins by pulling straight out. The skins can easily removed without the use of tools.
- To have access to the drive subchassis, proceed as follows:
Remove the six Phillips head screws along the top and sides of the rear door of the drive subchassis, and open the door downward.
- To have access to the inside of the enclosure via the top, proceed as follows:
Remove the Phillips screws in the top plate and remove the top plate.

Replacing covers

Replacing the covers is not difficult, if you did retain all the material it is just a piece of cake.

Access to the backplane

Via two doors, at the left and right side of the enclosure, there are two doors which do give access to the backplane. The doors can be opened by removing the three Phillips screws (per door) attaching the doors.

Adding an MVME module

- Remove the covers, see above.
- When inserting an MVME module into the MVME card rack the module has to be strapped in according to the specifications given in the chapter describing the module.
- When installing an MVME module into the card rack the Bus Grant In (BGxIN) and Bus Grant Out (BGxOUT) daisy chain jumpers and the Interrupt Acknowledge (IACK) strap have to be taken out. These straps are for the P9090 cabinet located on the front of the backplane. The straps belonging to the VME card slot are to the right of that card slot (seen from the front).
- Slide the MVME module into the card rack, aling it into the card slot and push it (firmly at both sides) into the connector until it is seated.
- Fasten the screws which are securing the module in the card rack and which are giving a good ground connection. Do not fasten the screws too much. To many MVME modules are returned to the workshop with damaged screws.

Transition Module

Some MVME modules go together with a Transition Module which has to be mounted at the rear of the cabinet.

- Remove the covers.
- Remove the metal plate covering the slot for the Transition Module and slide the Transition Module into place. Secure it with the screws into the cabinet.
- Make the connections from the Transition Module to the P2 connector (used by the belonging MVME module) at the rear of the backplane.
- When removing a Transition Module, store it in an anti static bag or box, remove the belonging cable(s), and reinstall the metal plate to close the hole in the rear of the cabinet.
- Replace the covers and test the system.

Removing an MVME module

- Remove the covers.
- When removing an MVME module from the card rack, loosng the screws which secures the module into the card rack, take the module out and store it in an anti static bag or box.
- Remove the cabling and Transition Module belonging to the removed MVME module.
- Reinstall the BGxIN, BGxOUT and IACK jumpers on the front of the backplane.
- Reinstall the metal plate covering the empty card slot to secure a good air flow inside the cabinet, and reinstall the covers. Test the system.

Remove a flexible disk or tape

The flexible disk and/or tapes are mounted on the drive mounting brackets in the upper right corner of the enclosure, seen from the front.

To remove a flexible disk or tape device from the upper part of the chassis proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the covers, see above.
- Identify, mark, and remove all cables connected to the drive(s) to be removed.
- It will be necessary to remove the drive mounting brackets from the system. Loosening the four screws holding the bracket in place, gently pull the brackets out. Remove the power and data cables from the drive(s) which are installed.
- Loosening the screws on either side of the drive and remove the drive out of the subchassis.

NOTE If this is a permanent removal, ensure that the remaining drive identifications are correct and the terminating resistors are properly installed.

Also install a drive filler panel to close the gap.

- Replace the covers and test the system.

Remove a disk

To remove a disk device from the chassis proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the covers, see above.
- If the drive to be removed is the first, second, or third drive, open up the drive access panel in the top rear of the system.
If it is the fourth drive it is present in the front of the enclosure.
- Identify, mark, and remove all cables connected to the drive(s) to be removed.
- Loosening the mounting screws on either side of the drive cradle and pull it out. Remove the drive cradle and retain it for later use.

NOTE If this is a permanent removal, ensure that the remaining drive identifications are correct and the terminating resistors are properly installed.

- Replace the covers and test the system.

Adding a flexible disk or tape

To add a flexible disk or tape device proceeds as follows:

- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the covers, see above.
- Prepare the drive, see the particular chapter in this book.

- It will be necessary to remove the drive mounting brackets from the system. Loosening the four screws holding the bracket in place, gently pull the brackets out. Remove the power and data cables from the drive(s) which are installed.
- Remove the drive filler panel from the appropriate position.
- Install the drive in the proper position and secure it with the four screws which are supplied with the kit.
- Gently slide the drive assembly back into the drive slot until the drive mounting bracket flanges contact the flanges in the drive assembly. Tighten the mounting screws on either side of the drive mounting brackets.
- Connect the power and data cables to the drive(s).

NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

- Replace the covers and test the system.

Adding a disk

To add a disk proceeds as follows:

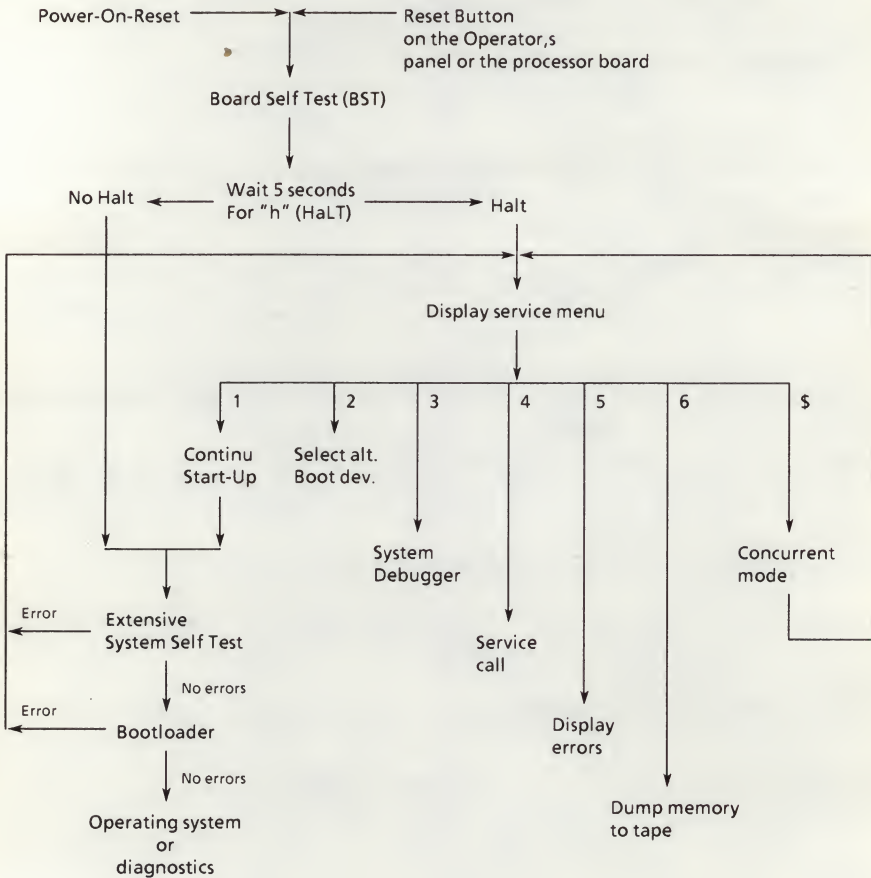
- Power off the system and disconnect the power cord from the chassis.
- Follow the ESD rules.
- Remove the covers, see above.
- Prepare the drive, see the particular chapter in this book.
- If the drive to be added is the first, second, or third drive, it must be installed in the drive subchassis, so open up the drive access panel in the top rear of the system.
If it is the fourth drive to be added it is present in the front of the enclosure.
- The drive should come with the required mounting material. If not yet done, mount the drive to the drive cradle.
- Gently slide the new drive assembly into the correct drive slot, see the figure of the P9090 enclosure in the start of this section, until the drive cradle mounting flanges contact the flanges in the drive assembly. Tighten the mounting screws on either side of the drive cradle.
- Connect the power and data cables to the drive(s).

NOTE Take care that drive identifications are correct and the terminating resistors are properly installed.

- Replace the covers and test the system.

2.7 Power-on/reset

1. Before powering on the system itself it is required to power-up all peripherals, this is including system console and all terminals which are connected to the system cabinet. This is required to protect the interface drivers on the serial controllers to be damaged.
2. Power-up the system via the On/Off switch
For the P9070 cabinets: Key switch to 'run'
For the P9090 cabinets: Key switch to 'normal'
3. Follow flowchart below



2.8 SURVEY OF CABLES

2.8.1 List of Cables

Power Cables

Type	Length (m)	Comm. 12NC	Description
MVME CORDUK	2.4	8700 090 79003	British Power Cord P9030/35/45/50/70
MVME CORFRG	2.4	8700 090 79004	German Power Cord P9030/35/45/50/70
MCORD 10 UK-2-8	2.4	8700 090 79015	British Power Cord P9090
MCORD 16 FRG-2-8	2.4	8700 090 79016	German Power Cord P9090
MCORD 20 USA-1-8	2.4	8700 090 79018	USA Power Cord P9090 110V
MCORD 15 CSA-1-8	2.4	8700 090 79002	Canada Power Cord P9090 110V
MCORD 20 NA-2-8	2.4	8700 090 79029	North America Power Cord P9090 110V

RS-232C Cables

Type	Length (m)	Comm. 12NC	Description
MVME CBL 330	7.5	8700 090 79007	Terminal or Printer
MVME CBL 331	15	8700 090 79008	Terminal or Printer
MVME CBL 332	30	8700 090 79009	Terminal or Printer
MVME CBL 333	60	8700 090 79010	Terminal or Printer
MVME CBL SA2	0.6	8700 090 79019	DB9-DB25 adapter cable
MVME CBL T25	7.5	8700 090 79021	DB9-DB25 to Centronics Printer cable

RS-232C Modem Cables

Type	Length (m)	Comm. 12NC	Description
MVME CBL 261	4.5	8700 090 79005	System - Remote Term.
MVME CBL 285	4.5	8700 090 79006	Remote Printer Modem

PERTEC / CIPHER Cables

Type	Length (m)	Comm. 12NC	Description
P3544-101	5.0	8700 090 79012	9-Track Tape to CNTRL

SCSI Cables

Type	Length (m)	Comm. 12NC	Description
P3540-801		8700 090 79017	SCSI connection for P3544/P3549
MVME CBL SCSI 8	2.44	8700 090 79023	SCSI extension cable

PC Cable

Type	Length (m)	Comm. 12NC	Description
P3209-011	2,5	8702 320 98011	PC to System Cable

10BASE2 Thin Coax Cable and Connector Sets

Type	Comm. 12NC	Description
Cable 119	8700 090 90892	Thin Coax 10BASE2 RG 58 C/U, 200m
CONSET14	8700 090 90922	BNC-male connectors RG 58 (50 pcs)
CONSET15	8700 090 90932	Wall Plate with 2 BNC female connectors (10 pcs)
CONSET16	8700 090 90942	BNC-T connectors for NP500 (10 pcs)
CONSET17	8700 090 90952	BNC-male terminators (2 pcs)

P2601 Multi Port Repeater

Type	Comm. 12NC	Description
P2601-001	8700 090 91002	Multi Port Repeater 220V, 8 ports + AUI connector
P2601-002	8700 090 91012	Multi Port Repeater 110V, 8 ports + AUI connector
P2602-001	8700 090 91232	Dual Port Repeater 110V
P2602-002	8700 090 91242	Dual Port Repeater 220V

AUI Cable (10BASE5)

Type	length (m)	Comm. 12NC	Description	
			From	To
122	15	8700 090 91032	P9000 m-series	Med. Attachm. Unit

Centronics printer cables

Type	Length (m)	Comm. 12NC	Description
MVME CBL CP25	7.5	8700 090 79020	DB25 to Centronics Printer cable

MVME336 TELCO (Hub-Server connection)

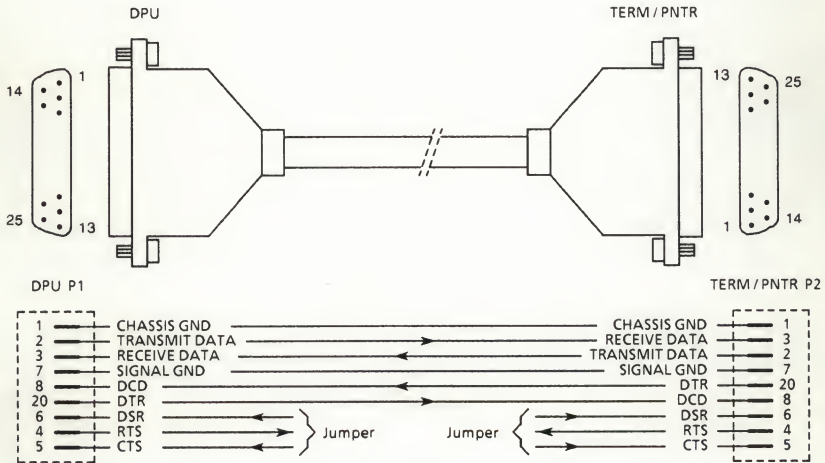
This cable is delivered together with the Server and has a standard length of 15 meter.

Coax cable (MVME338)

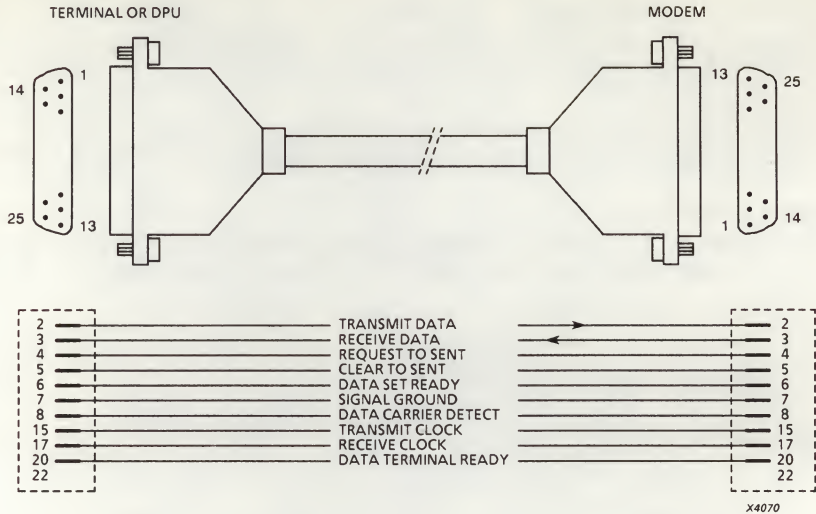
The coax cable for the MVME338 Terminal Subsystem is a 93 Ohm type (RG62AU), and can be bought locally. The same cable is used to connect terminals to the P7X00.

2.8.2 Cable Descriptions

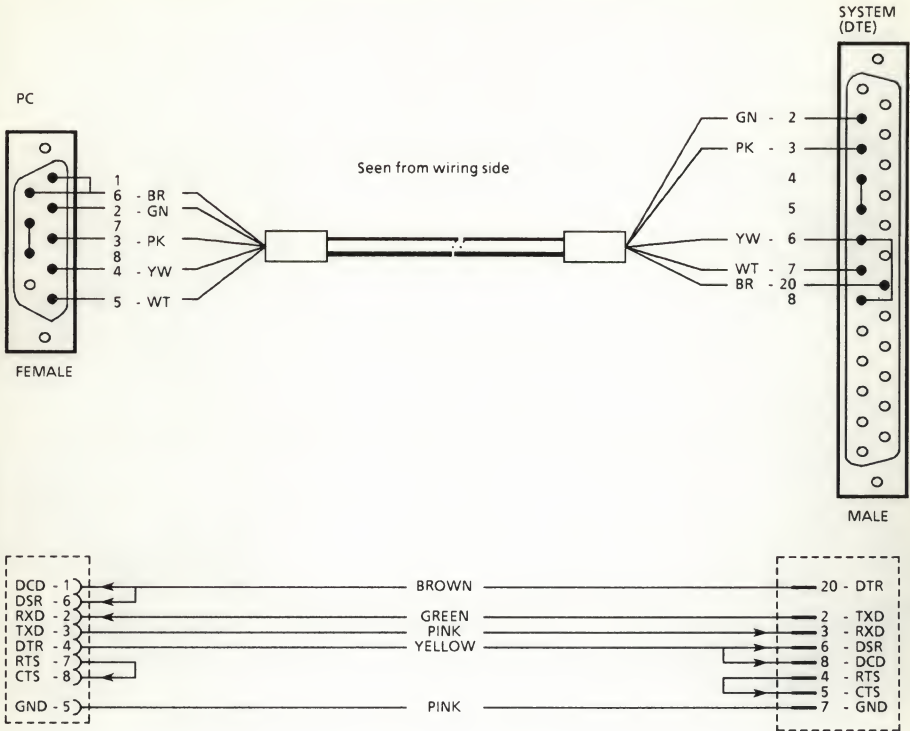
RS-232C Cables



RS-232C Modem Cables

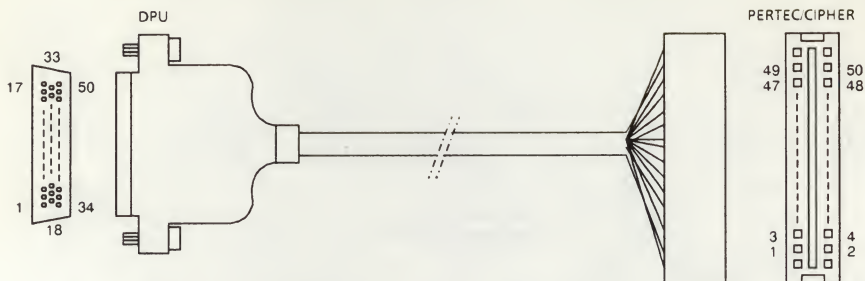


PC to System (DTE) / DB9 to DB25 Serial Adapter Cable



The cable is shielded with FRAME GND and connector shells connected to the shield.

PERTEC / CIPHER



NOTE: The two used cables between dpu and tape drive are physical identical

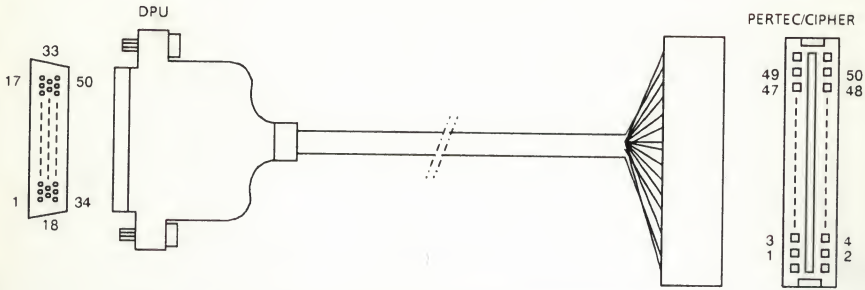
CABLE J1 (P1)

SIGNAL	PIN	RETURN
FFBY	2	1
FLWD	4	3
FWD4	6	5
FGO	8	7
IWD0	10	9
FWD1	12	11
USER DEFINED*	14	13
USER DEFINED*	16	15
FREV	18	17
FREW	20	19
FDWVP	22	21
FWD7	24	23
FWD3	26	25
FWD6	28	27
FWD2	30	29
FWD5	32	31
FWRT	34	33
USER DEFINED*	36	35
FEDIT	38	37
FERASE	40	39
FWFM	42	41
USED DEFINED*	44	43
ITAD0	46	45
FRD2	48	47
FRD3	50	49

* Not used

SIGNAL	PIN	RETURN
IFBY	2	1
ILWD	4	3
IWD4	6	5
IGO	8	7
IWD0	10	9
IWD1	12	11
USER DEFINED*	14	13
USER DEFINED*	16	15
IREV	18	17
IREW	20	19
IDWVP	22	21
IWD7	24	23
IWD3	26	25
IWD6	28	27
IWD2	30	29
IWD5	32	31
IWRT	34	33
USER DEFINED*	36	35
IEDIT	38	37
IERASE	40	39
IWFM	42	41
USED DEFINED*	44	43
ITAD0	46	45
IRD2	48	47
IRD3	50	49

PERTEC / CIPHER (Continued)



NOTE: The two used cables between dpu and tape drive are physical identical

CABLE J2 (P2)
CONTROLLER SIDE

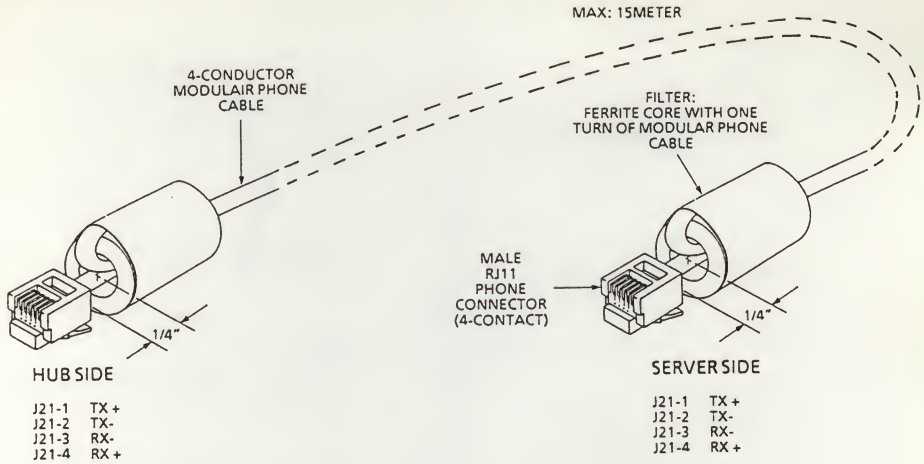
SIGNAL	PIN	RETURN
FRDP	1	5
FRD0	2	5
FRD1	3	5
FLDP	4	5
FRD4	6	5
FRD7	8	7
FRD6	10	9
FHER	12	11
FFMK	14	13
FID	16	15
FFEN	18	17
FRD5	20	19
FEOT	22	21
FOFL	24	23
USER DEFINED*	26	25
FRDY	28	27
FRWD	30	29
FFPT	32	31
FRSTR	34	33
FDWDS	36	35
FDBY	38	37
FSPEED	40	39
FCER	42	41
FONL	44	43
FTAD1	46	45
FFAD	48	47
USER DEFINED*	50	49

* NOT USED

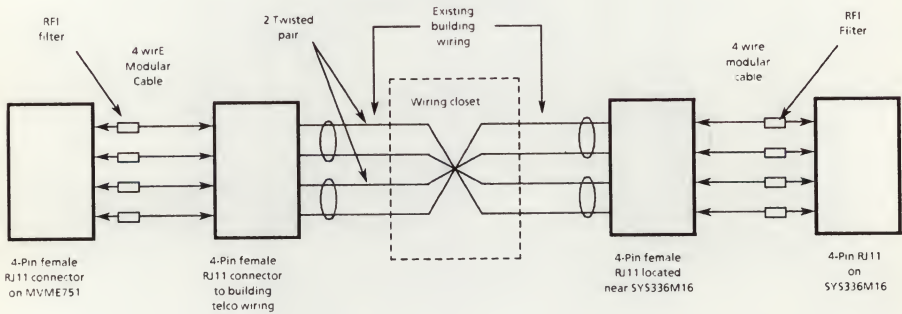
PERTEC/CIPHER SIDE

SIGNAL	PIN	RETURN
IRP	1	5
IR0	2	5
IR1	3	5
ILD P	4	5
IR4	6	5
IR7	8	7
IR6	10	9
IHER	12	11
IFMK	14	13
IIDENT	16	15
IFEN	18	17
IR5	20	19
IEOT	22	21
IRWU	24	23
*	26	25
IRDY	28	27
IRWD	30	29
IFPT	32	31
IRSTR	34	33
IWSTR	36	35
IDBY	38	37
*	40	39
ICER	42	41
IONL	44	43
ITAD1	46	45
IFAD	48	47
*	50	49

TELCO

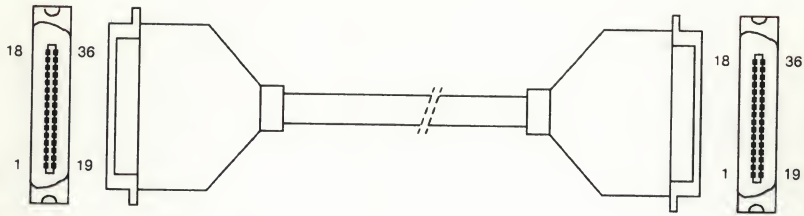


In case the Server is to be located more then 15 meters the connection should be as follows:



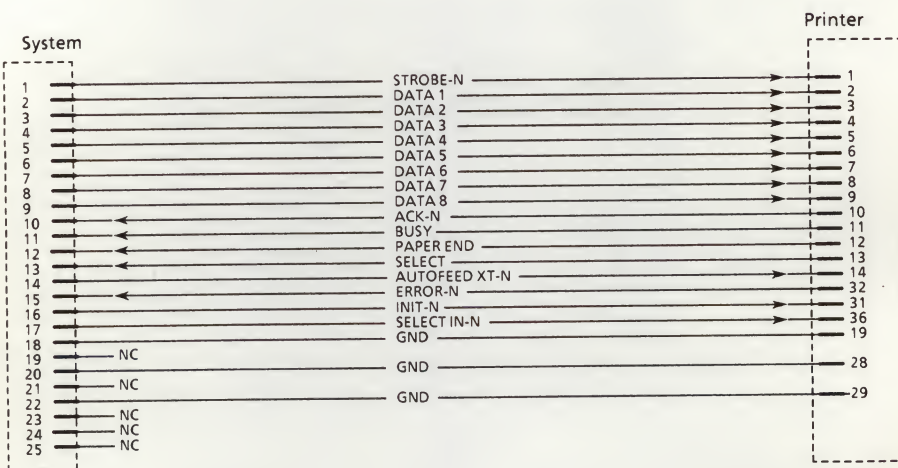
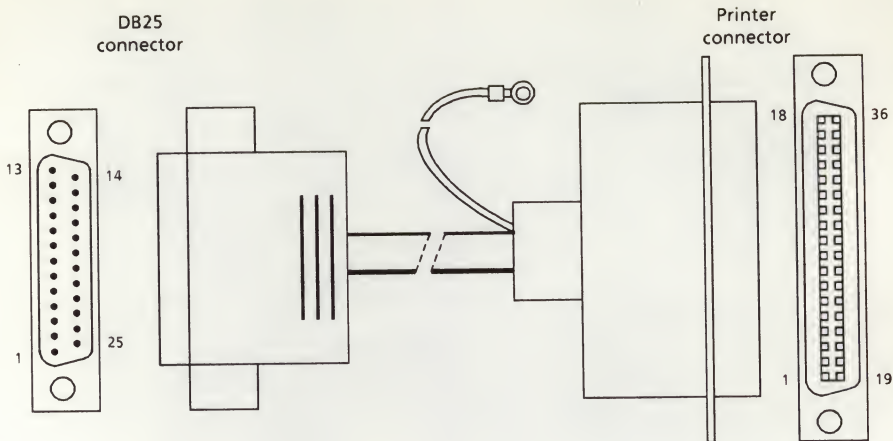
Maximum length: 240 meter.

When installing this cable a twist (or wiring-swapping) in the line must be made. Instead of wiring one to one (pin 1 to pin 1, pin 2 to pin 2, etc.), invert the order (pin 1 to pin 4, pin 2 to pin 3, pin 3 to pin 2, pin 4 to pin 1).



SIGNAL	PIN	RETURN
DATA STROBE	1	19
DATA 1	2	20
DATA 2	3	21
DATA 3	4	22
DATA 4	5	23
DATA 5	6	24
DATA 6	7	25
DATA 7	8	26
DATA 8	9	27
ACKNOWLEDGE	10	28
BUSY	11	29
PAPEROUT	12	NONE
SELECT PRINTER	13	NONE
NOT USED	14	NONE
NOT USED	15	NONE
NOT USED	16	NONE
NOT USED	17	NONE
NOT USED	18	NONE
GND	19	GND
GND	-	GND
GND	-	GND
GND	-	GND
INPUT PRIME	31	30
FAULT	32	NONE
NOT USED	33	NONE
NOT USED	34	NONE
NOT USED	35	NONE
NOT USED	36	NONE

Same wiring as in the left connector



The cable is shielded with frame ground and connector shells connected to the shield

2.9 SOFTWARE INSTALLATION

2.9.1 System V/68 and V/88 Operating System

The system V/68 and V/88 Software Release Guide, contains detailed information about:

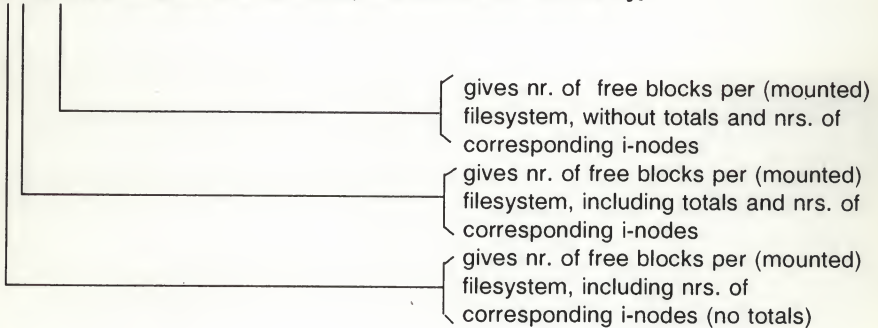
- Installing operating system.
- Upgrading operating system.

In this section only structural and necessary information is given. For more detailed information you must use the Software Release Guide.

Check availability of required diskspace as indicated in the Software Release Guide. This can be done with the utility **df**.

Usage of **df**:

df [-lt] [-f] [{<filesystem><directory><mounted resource>}]



Installation of System V/68 requires a minimum of 4 Mbyte DRAM.

Installation of System V/88 requires a minimum of 8 Mbyte DRAM.

2.10 Explanation of Engineering Part Number

Motorola drawing / document number

0 1 - W3370B16

Motorola Computer Division Part Number

0 1 - W3370B16

- Item number (2 or 3 characters)
 - . identifies part on drawing; or
 - . identifies process step in manufacturing
- Alpha expander
 - A) expands amount of drawing numbers that can be used;
 - B) separator between drawing number and item nr.;
 - C) expands number of items that can be used.
- Numeral sequence number
- Division identifier (who authorized the release).
 - W = Motorola USA;
 - G = Motorola Germany;
 - C = Motorola Germany
- Filter character
 - = no drawing, but bill of materials
 - N = no drawing sheet
 - A,B,etc = master document used for filing (location).
- Category destination
 - . indexes to film
 - . 01 = mix. assemblies

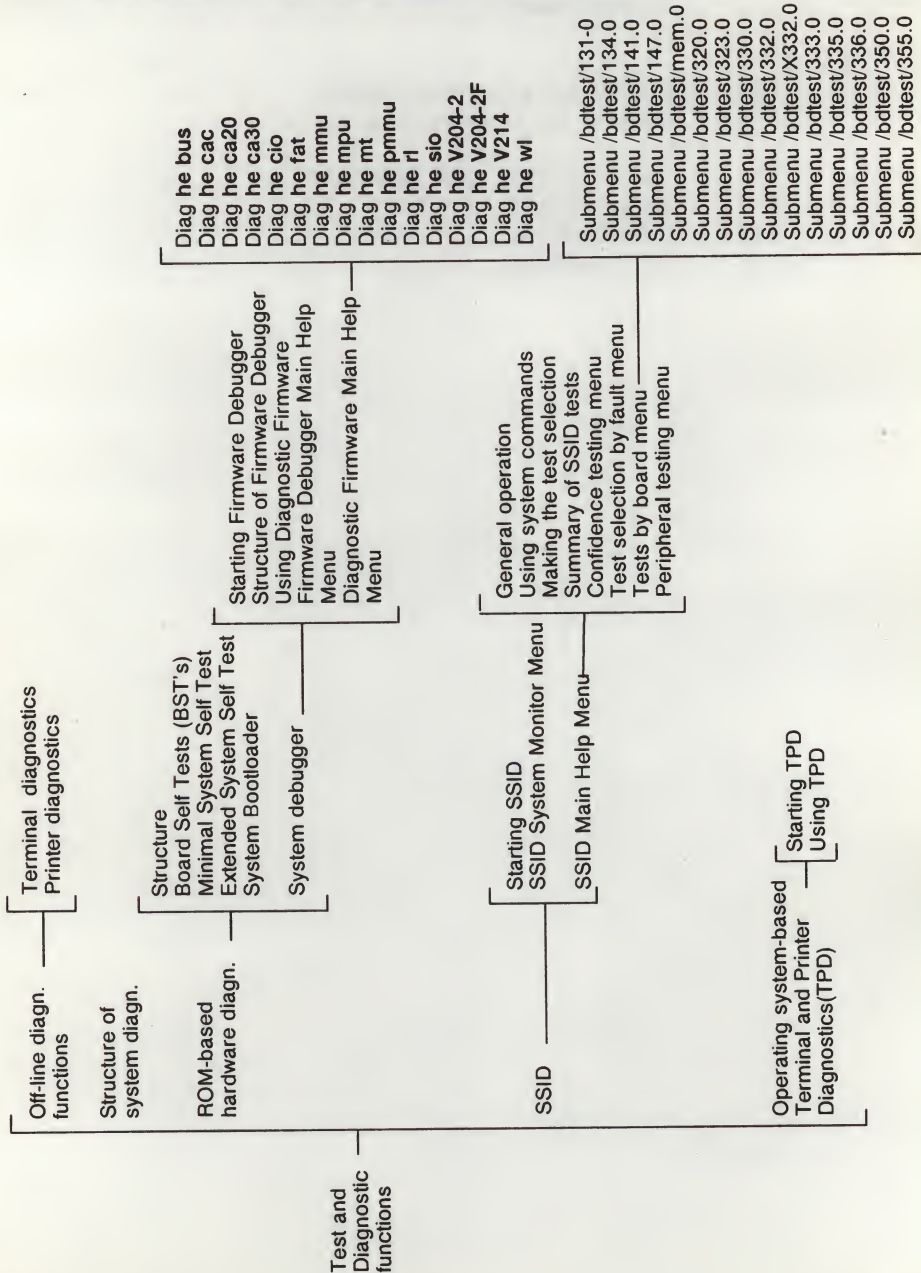
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	3.1.1	Overview of Test and Diagnostic Functions
	3.2	OFF-LINE DIAGNOSTIC FUNCTIONS
	3.2.1	Terminal Diagnostics
	3.2.2	Printer Diagnostics
	3.3	STRUCTURE OF SYSTEM DIAGNOSTICS
	3.4	ROM-BASED HARDWARE DIAGNOSTICS
	3.4.1	Structure of ROM-based Hardware Diagnostics
	3.4.2	Board Self Tests (BST's)
	3.4.3	Minimal System Self Test (Min.SST)
	3.4.4	Extended System Self Test (Ext. SST)
	3.4.5	System Bootloader
	3.5	SYSTEM FIRMWARE DEBUGGER
	3.5.1	Starting Firmware Debugger
	3.5.2	Structure of Firmware Debugger
	3.5.3	Using Diagnostic Firmware
	3.5.4	Debugging Firmware Main Help Menu
	3.5.5	Diagnostic Firmware Main Help Menu
	3.6	SSID
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	3.6.2	SSID System Monitor Menu
	3.6.3	SSID General Operation
	3.6.4	SSID Using System Commands
	3.6.5	SSID Making the Test Selection
	3.6.6	Summary of SSID Test and Diagnostics
	3.6.7	Supported Boards
	3.7	OPERATING SYSTEM-BASED TERMINAL AND PRINTER DIAGNOSTICS (TPD)
	3.7.1	Starting TPD
	3.7.2	Using TPD
	3.8	PREVENTIVE MAINTENANCE

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	3.9.2	Entering Run Level 2 (multi-user)
	3.9.3	System Life Cycle
	3.9.4	Administrative Directories and Files
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	3.9.6	Hardware Dumps
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	3.10	ERROR MESSAGES
	3.10.1	Processor Firmware Error
	3.10.1.1	Processor Debugger Error Messages
	3.10.1.2	Processor Diagnostic Error Messages
	3.10.1.3	Other Error Messages from the Firmware
	3.10.2	Device Communication Status Codes
	3.10.2.1	Device Communication Status Codes for the MVME147
	3.10.2.2	MVME187 SCSI Firmware Status Codes
	3.10.2.3	Device Communication Status Codes for the MVME320
	3.10.2.4	Device Communication Status Codes for the MVME323
	3.10.2.5	Device Communication Status Codes for the MVME327A
	3.10.2.6	Device Communication Status Codes for the MVME328
	3.10.2.7	Device Communication Status Codes for the MVME350
	3.10.3	Error Messages Under SSID
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	3.10.5	UNIX Error Logging
	3.10.5.1	UNIX Start/Stop Record
	3.10.5.2	Error Record for the MVME147
	3.10.5.3	Error Record for the MVME320
	3.10.5.4	Error Record for the MVME323
	3.10.5.5	Error Record for the MVME327A
	3.10.5.6	Error record for the MVME328
	3.10.5.7	Error Record for the MVME350
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	3.10.5.9	Error Record for Stray Interrupt
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3.1 TEST AND DIAGNOSTIC FUNCTIONS

3.1.1 Overview of Test and Diagnostic Functions



3.2 OFF LINE DIAGNOSTIC FUNCTIONS

3.2.1 Terminal Diagnostics

For Power-up/Selftest of the terminals: See chapter 21.

3.2.2 Printer Diagnostics

For off-line diagnostic of the printers: See chapter 20.

3.3 STRUCTURE OF SYSTEM DIAGNOSTICS

LEVEL	NAME
1	ROM-based hardware diagnostics
2	Disk-based stand-alone System Interactive Diagnostics (SSID)
3	Operating system-based Terminal and Printer Diagnostics (TPD)

3.4 ROM-BASED HARDWARE DIAGNOSTICS

3.4.1 Structure of ROM-based Hardware Diagnostics

NAME	ROM LOCATION	AFFECTS	STARTED BY
Board Self Tests (BST's)	All MVME modules	All individual boards	Power on/reset
Minimal System Self Test	Processor board	Local processor resources	Power on/reset
Extended System Self Test	Processor board	Processor board and other MVME modules	Successful end of Min. SST
System Boot loader	Processor board (default boot devices)	Loading of first 512 bytes of boot device	Successful end of Ext. SST(default) System console (Alternate boot dev.)
System Debugger	Processor board	All boards, drives, terminals and printers	System console

3.4.2 Board Self Tests (BST's)

1. Board self tests are started at power on/reset on all:
 - Intelligent Peripheral Controllers (IPC's)
 - Intelligent Communication Controller (ICC's)
2. Processor System Self Tests do not test interaction with IPC's and ICC's
3. If BST fails the operating system will send a failure message to the system console
4. SSID can then be loaded and executed to test and diagnose interaction with all system components

3.4.3 Minimal System Self Test (Min.SST)

1. Min.SST is an automatic test sequence without user intervention
2. If a test fails, an error message is displayed if the console can be accessed
3. After the 'test passed' message there is a five second delay to type an h and halt the start-up sequence, and display the service menu (see chapter 2)
4. If the start-up sequence is not halted the system will continue into Extended System Self Test
5. The contents of the Minimal System Self Tests depends on the type of processor module in use.

3.4.4 Extended System Self Test (Ext.SST)

1. Ext.SST is an automatic test sequence without user intervention.
In systems based on an MVME188(A) RISC processor the tests run during System Self Test are enabled or disabled via a mask which is present in the NVRAM. Via the mask command it is possible to modify and tune the mask.
2. If an Ext. SST fails, 'FAILED' is displayed, the testing stops and the service menu is displayed (see chapter 2).
3. The test line indicates which test failed.
With some catastrophic failures, the test may hang or abort, display register information followed by 1xx Diag > prompt.
4. **P** in the test line message is the sub-test code for VMEbus tests.
5. **MEM/CPU Bd:** in the test line message indicates that in case of a failure the memory boards should be replaced first; if the failure persists: replace the CPU board.
6. If all tests passed, Ext. SST will go to:
 - System boot loader and boot from the default device; or
 - Boot from the previously selected alternate boot device (see chapter 2).
7. The contents of the Extended SST tests differs per processor module.

3.4.5 System Bootloader

1. The (Processor-based) system bootloader contains information about the default boot device (prescribed hierarchy):

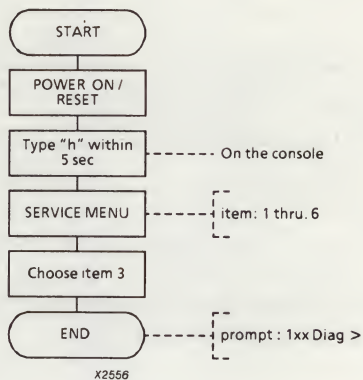
	MVME131/132/134	MVME141/147/187/188(A)
First default	controller 8, drive 0	Depending on settings in AB-
Second default	controller 4, drive 0	command
Third default	controller 2, drive 0	

See section 3.6.1 for SSID Boot Device Options.

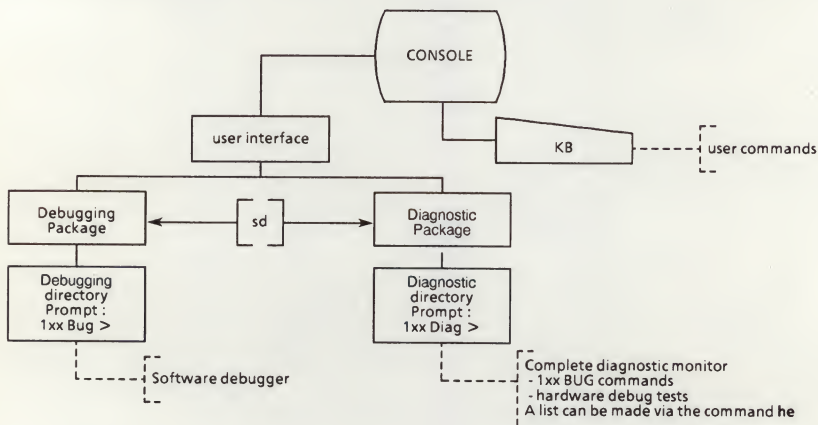
2. The Revision level of the Processor Bug (PROMS) is displayed on the system console after successful start up
3. The default boot device can be changed by choosing an alternate boot device from the service menu (item 2), see chapter 1.

3.5 SYSTEM FIRMWARE DEBUGGER

3.5.1 Starting Firmware Debugger



3.5.2 Structure of Firmware Debugger



3.5.3 Using Diagnostic Firmware

1. The field support manual of the Debugging packages contains more detailed information about use, purpose and necessary environment of each individual test.
2. Memory allocation on MVME131/132, Environment switch (S3-1) on the Processor:

ON = on-board memory

OFF = system memory

For the Environment switch, see chapter 9 Processor.

Memory allocation on the MVME141 depends on the setting of the General Purpose jumpers J6 pin 1 thru 2:

IN = system memory

OUT = on-board memory

For the General Purpose jumpers, see chapter 9 Processor.

3. Using commands:

- enter commands in lower case characters;
- more than one command on one line, use format:
cmd1!cmd2!cmd3!cmd4
- to examine commands/tests in current directory (1st level), type: he
- subdirectories are indicated with (Dir)
- to examine command/tests in subdirectory (2nd level), type: he test <CR>
(example: he wl)
- subdirectories are (again) indicated with (Dir)
- to examine commands in subdirectory (3rd level), type: he test test <CR>
(example: he mmu z)
- all values are expected to be in hexadecimal format (think about IOP and IOT)
(see: dc = data conversion)
- commands examples:
mmu z o
mmu z o!mmu z 1! mmu z 2
le mmu z o

3.5.4 Debugging Firmware Main Help Menu

CMD	DESCRIPTION	130 BUG	134 BUG	141 BUG	147 BUG	181 BUG	187 BUG	188 BUG
AB	Autoboot enable			X	X	X	X	X
NOAB	Autoboot disable			X	X		X	X
AS	Assembler (equals MM ;DI)					X	X	X
BC	Block compare			X	X	X	X	X
BF	Block Fill	X	X	X	X	X	X	X
BI	Block Initialize	X	X	X	X	X	X	X
BM	Block Move	X	X	X	X	X	X	X
BS	Block Search	X	X	X	X	X	X	X
BV	Block Verity	X	X	X	X	X	X	X
BO	Boot Operating System	X	X	X	X	X	X	X
BH	Boot Operating System and Halt	X	X	X	X	X	X	X
BR	Breakpoint Insert	X	X	X	X	X	X	X
NOBR	Breakpoint Delete	X	X	X	X	X	X	X
CAD	Cache Accelerator Display	X						
CB	Cache Bit Test						X	X
CD	Cache Display					X	X	X
CM	Concurrent Mode					X	X	X
NOCM	No Concurrent Mode					X	X	X
CNFG	Configure Board Information Block						X	
CS	Checksum		X	X	X	X	X	X
DAD	Display Address Decoder							X
DC	Data Conversion & Expression Evaluation	X	X	X	X	X	X	X
DMA	DMA Block of Memory Move						X	
DS	Disassembler (equals MD ;DI)					X	X	X
DU	Dump S-Records	X	X	X	X	X	X	X
ECHO	Echo String						X	X
EEP	EEPROM Programming		X		X			
ENV	Set Environment			X	X		X	X
FORK	Fork Idle MPU at Address							X
FORKWR	Fork Idle MPU with Registers							X
GO	Go to target code	X	X	X	X	X	X	X
G	"Alias" for previous command	X	X	X	X	X	X	X
GD	Go Direct (no breakpoints)	X	X	X	X	X	X	X
GN	Go and stop after next instruction	X	X	X	X	X	X	X
GT	Go and insert temporary breakpoint	X	X	X	X	X	X	X
HE	Help facility	X	X	X	X	X	X	X
IDLE	Idle Current Processor							X
IOC	I/O Control	X	X	X	X	X	X	X
IOP	I/O to Disk and Tape	X	X	X	X	X	X	X
IOT	I/O "Teach"	X	X	X	X	X	X	X
IRD	Idle MPU Registers Display							X
IRM	Idle MPU Registers Modify							X
IRS	Idle MPU Registers Set							X
LO	Load S-Records	X	X	X	X	X	X	X
LSAD	LAN Station Address Display/Set				X			

* Not listed via HE.

3.5.4 Debugging Firmware Main Help Menu (Cont'd)

CMD	DESCRIPTION	130 BUG	134 BUG	141 BUG	147 BUG	181 BUG	187 BUG	188 BUG
MA	Macro define display			X	X	X	X	X
NOMA	Delete macro(s)			X	X	X	X	X
MAE	Macro edit			X	X	X	X	X
MAL	Enable macro expansion listing			X	X	X	X	X
NOMAL	Disable macro expansion listing			X	X	X	X	X
MAR	Load macros			X	X	X	X	X
MAW	Save macros			X	X	X	X	X
MD	Memory Display	X	X	X	X	X	X	X
MDS*	Memory Display Sector	X	X	X	X	X	X	X
MM	Memory Modify	X	X	X	X	X	X	X
M	"ALIAS" for MM command	X	X	X	X	X	X	X
MS	Memory Set	X	X	X	X	X	X	X
MENU	System Menu	X	X	X	X	X	X	X
MMD	Memory Map Diagnostics					X	X	X
MW	Memory Write						X	X
OBA	Set memory address for VMEbus		X		X			
OF	Offset Registers	X	X	X	X	X	X	X
PA	Printer Attach	X	X	X	X	X	X	X
NOPA	Printer Detach	X	X	X	X	X	X	X
PF	Port Format	X	X	X	X	X	X	X
NOPF	Port Detach		X	X	X	X	X	X
PS	Put RTC into power save mode for storage		X	X	X	X	X	X
RB	ROM boot enable			X	X	X	X	X
NORB	ROM boot disable			X	X	X	X	X
REMOTE	Connect the Remote modem to CSO			X	X	X	X	X
RESET	Warm Cold Reset	X	X	X	X	X	X	X
RD	Register display	X	X	X	X	X	X	X
RM	Register Modify	X	X	X	X	X	X	X
RS	Register Set			X	X	X	X	X
RL	Read Loop						X	X
RUN	MPU Execution/Status							X
SD	Switch directory	X	X	X	X	X	X	X
SET	Set Time and Date		X	X	X	X	X	X
SW4	Show Switch 4 Settings	X						
SYM	Symbol Table Attach						X	X
NOSYM	Symbol Table Detach						X	X
SYMS	Symbol Table Display/Search						X	X
TA	Terminal Attach	X	X	X	X	X	X	X
T	Trace instruction	X	X	X	X	X	X	X
TC	Trace on Change of Flow	X	X	X	X			
TT	Trace to temporary breakpoint	X	X	X	X	X	X	X
TM	Transparent Mode	X	X	X	X	X	X	X
TIME	Display Time and Date		X	X	X	X	X	X
VE	Verify S-Records	X	X	X	X	X	X	X
WL	Write Loop						X	X

* Not listed via HE.

3.5.5 Diagnostic Firmware Main Help Menu

CMD	DESCRIPTION	130 DIAG	134 DIAG	141 DIAG	147 DIAG	181 DIAG	187 DIAG	188 DIAG
ADT	Address Decoder Test (Dir)						X	X
BERR	Buss Error Test		X	X	X			
BUS	VME & VSB Bus Tests (Dir)	X						
CAC	Cache Accelerator Diagnostics (Dir)	X						
CA20	M68020 on-chip cache tests (Dir)	X	X					
CA30	M68030 on-chip cache tests (Dir)			X	X			
CIO	Z8036 CIO Counter/Timer (Dir)	X					X	X
CT	Cache Test (Dir)					X	X	X
DE	Display errors	X	X	X	X	X	X	X
DP	Display Pass Count	X	X	X	X	X	X	X
FAT	Final Assembly Test (Dir)	X					X	X
FATC	Final Assembly Test CPU Board						X	X
FATH	Final Assembly Test HYPERmodule						X	X
FATM	Final Assembly Test Memory board						X	X
FATU	Final Assembly Test Utility board						X	X
XFAT	eXternal Final Assembly Test						X	X
FPC	Floating Prt. Coprocessor Test		X	X	X			
HALT	Light HALT & FAIL LED's	X						
IRQ	Local Interrupt Tests (Dir)						X	X
HE	Give list of available commands	X	X	X	X	X	X	X
LAN	LANCE Funct. Test				X			
LANX	LANCE External Loopback Test				X			
LC	Loop- Continue mode	X	X	X	X	X	X	X
LE	Loop-on Error mode	X	X	X	X	X	X	X
MASK	Self Test Mask for ST command						X	X
MFP	MFP Funct. Test		X					
MFPRST	MFP Timer B Funct. Test		X					
MMU	Memory Management Unit Test (Dir)	X		X	X	X	X	X
MPU	MPU Tests for the 68020 (Dir)		X	X	X			
MT	Memory Tests (Dir)	X	X	X	X	X	X	X
NV	Non-Verbose mode	X	X	X	X	X	X	X
PCC	PCC Funct. Test				X			
PMMU	Paged Mem. Management Test (Dir)		X					
RL	Read Loop (Dir)	X	X	X	X	X	X	X
RTC	Real Time Clock Test		X	X	X		X	X
SCC	Z8530 Funct. Test		X					
SD	Switch to Bug Mode	X	X	X	X	X	X	X
SE	Stop-on-Error mode	X	X	X	X	X	X	X
SIO	Serial I/O tests (Dir)	X		X		X		X
SM	Modify Self Test Mask	X						
SRAM	Static RAM TEST (Dir)						X	X
ST	Self Test sequence	X	X	X	X	X	X	X
STAT	Status Register Bit Test		X					
SST	System Self Tests	X	X					
VME	VME Interface Test (Dir)						X	X
VMEGA	VME Gate Array Test			X	X			

The Bug commands are also available in Diag.

3.5.5 Diagnostic Firmware Main Help Menu (cont'd)

CMD	DESCRIPTION	130 DIAG	134 DIAG	141 DIAG	147 DIAG	181 DIAG	187 DIAG	188 DIAG
V204-2	VME204-2 tests (Dir)	X						
V204-2F	VME204-2F tests (Dir)	X						
V214	VME214 test (Dir)	X						
WL	Write Loop (Dir)	X	X	X	X	X	X	X
WR	Write/Read Loop (Dir)			X	X	X	X	X
ZE	Clear error Counters	X	X	X	X	X	X	X
ZP	Zero Pass Count	X	X	X	X	X	X	X

The Bug commands are also available in Diag.

A complete list of all supported commands for a processor board can be obtained with the HE command.

If a diagnostic command contains a test suite, the test suite can be displayed with the HE command followed by the name of the diagnostic command, an example:

141-Diag > HE MMU

MMU Memory Management Unit Test (Dir)

A MMU/CPU Bd: RP register

B MMU/CPU Bd: TC register

C MMU/CPU Bd: Super_Prog space

.....

3.6 SSID

3.6.1 Starting SSID

The SSID user's guide provides additional and more detailed information. In this section only essential information is given.

Method 1 (not skipping Ext.SST)

- Choose item 2 from service menu (Select Alternate Boot Device)
- Type: **x,y,z <CR>**
with x = Controller LUN
y = Device LUN
z = Boot file

For values, see next table.

- Choose item 1 from service menu (continue system start-up)
- After successful Ext.SST and boot, the SSID system monitor menu is displayed on system console.

Method 2 (skipping Ext.SSt)

- Choose item 3 from service menu (go to system debugger)
- Type: **bo x, y, z**
 - with x = Controller LUN
 - y = Device LUN
 - z = Boot file

For values, see next table.

- After successful boot, the SSID system monitor menu is displayed on system console.

NOTES: 1. *The SSID program runs in a stand alone environment, it does not interact with the UNIX operating system at any time.*
2. *Once booted, SSID has completed control over all hardware and peripherals.*

SSID Boot Device Options

CONTROLLER	DRIVE	FILE
<u>Winchester</u> MVME841 0 = first MVME320A/B 1 = second MVME320A/B	0, 1	diag/testPN*
<u>ESDI Disk Drive</u> MVME842, MVME843 8 = MVME323	0, 1, 2, 3	diag/testPN*
<u>SCSI Disk Drive</u> via MVME147(A)-1 0 = first SCSI-CU 1 = second SCSI-CU 2 = third SCSI-CU 3 = fourth SCSI-CU	first SCSI drive second SCSI drive third SCSI drive fourth SCSI drive	diag/testPN*
<u>SCSI Disk Drive</u> via MVME327A 0 = first SCSI-CU 1 = second SCSI-CU 2 = third SCSI-CU 3 = fourth SCSI-CU	first SCSI drive second SCSI drive third SCSI drive fourth SCSI drive	diag/testPN*
via MVME328 0 = first SCSI-CU 1 = second SCSI-CU 2 = third SCSI-CU 3 = fourth SCSI-CU	first SCSI drive second SCSI drive third SCSI drive fourth SCSI drive	diag/testPN*
<u>Streaming Tape</u> MVME851, MVME853Q 4 = first MVME350 5 = second MVME350	First streamer tape drive Second streamer tape drive	testPN*
MVME852, MVME853, MVME854 or MVME855 4 = fifth SCSI-CU 5 = sixth SCSI-CU	First streamer tape drive Second streamer tape drive	testPN*

* **PN** = processor number 132, 134, 141**, 147***, 18x

** In older releases this SSID is split up in test141.161 for systems with MVME842 (WREN III) and test141.300 for systems with MVME843 (WREN V).

*** In older releases this SSID was split-up in: test147.150 for systems with MVME874 (WREN III) / test147.300 for systems with MVME875 (WREN IV)

For example, to boot SSID from the first FXD on a MVME141-based system, type **8,0/diag/test141** in response to the "Enter Alternate Boot Device" prompt. In this example, **8** is the first MVME323 controller, **0** is the first FXD (device #0), and **/diag/test141** is the file to be loaded.

3.6.2 SSID System Monitor Menu

SA:

```
*****
***** SYSTEM COMMANDS ***** MENU SELECTIONS *****
* help      remote   disperr   **                               *
* /         cmdline  version   **          confid    bdtest    *
* disphrd   clear    setopt    **          fault    ptest    *
* view      slctdev  gotobug   **                               *
*****
```

Current Menu is / - "System monitor"

help	- Using Diagnostics
confid	- Confidence Testing
fault	- Test Selection by Fault
bdtest	- Tests by Board
pctest	- Peripheral Testing
pctesti	- Peripheral Testing continued
cmdline	- Command Line Operations

SA: -----

↑
type in one of the items mentioned above
these items are explained in the following sections

3.6.3 SSID General Operation

Displays

System Diagnostics are primarily menu driven. Notice screen displays have two parts, a Command Review Block at the top and Menu selections below. The Command Review Block will serve as a reminder of the system commands and menus that can be selected.

Keyboard Input

All keyboard entered commands are terminated by a CR (Carriage Return) Typing errors should be corrected before entering a CR by typing a "control h" or a back-space (ASCII CODE HEX 08).

Menus

Menus may continue to be displayed until a specific file has been selected. Any menu may be accessed by entering the menu name and CR. This option is available whether or not the Command Review Block is displayed.

Running Tests

When making a selection from the CONFIDENCE, FAULT, or PERIPHERAL test menus, a suite of tests is performed. BOARD test menu selections will execute one test at a time.

It is advisable to read the HELP item for any test or test suite before executing it. Some floppy disk and streaming tape tests are destructive.

Terminating a Test

Using the BREAK function key to abort a test sequence is not recommended. If an abort is necessary, it is advisable to reboot SSID before executing additional test sequences.

Terminating System Diagnostics

System Diagnostics may be terminated at any point with no damage to any disks or boards by power-off or system reset.

3.6.4 SSID Using System Commands

System commands are used to perform non-test related functions.

They may be executed at any time when a test is not in progress by typing the keyword displayed in the command review block.

help

Displays the help menu. When you exit help the display will return to the previous menu.

/

To return to "home" or "top" menu enter a "/".

disphrd

The display hardware keyword lists the hardware (MVME modules) automatically sensed by the diagnostics. If an MVME module is completely dead it may not be recognized. The feature disphrd reads the CSRs of each installed MVME module.

remote

Remote mode allows automatic dial in to the Customer Service Center (CSC) for assistance, or connecting to a remote terminal on port 2 of the Processor transition module. A prompt for the CSC telephone number will appear after the modem is tested. Once connected to the remote site, all keyboard and display functions will be in parallel. To disconnect the remote link, select remote and wait for the disconnection prompt. All Diagnostics functions may be performed from the remote site!.

cmdline

The command line mode displays a new prompt ">".

To return to the menu mode, type "**set menu** CR". For specific information on commands, type "**he** CR" from the cmdline prompt. Command Line mode is reserved for the advanced user of the Diagnostics.

A very important command is the **cf** (configure test) command, this command can edit the default test configuration.

Example: > cf bctest/x333.0/sp.0

/bctest/x333.0/sp.0 configuration

Controller type [WAN, X-25] = X-25 ?

src port no [1-6] = 3 ?

dest port no [1-6] = 1 ?

xfer size = 1024 ?

baud rate = 9600 ?

To change a default value enter the a new value behind the questionmark and return to the test menu (by typing set menu) or execute the test from the command file.

clear

This keyword will clear all errors and pass counters.

disperr

Display error lists all accumulated errors and pass count.

If there are no errors, only the pass count will be displayed.

version

The version command will display the current revision of System Diagnostics.

setopt

The setopt command will allow the user to set options for tests, E.G. "loop a test". The lc, ce, ae, and time options should be the only options used by most user's.

The other commands are for the advanced user of Diagnostics.

NOTE: To stop the lc (loop-continue) option the user might have to use the break key. (See section 3.6.3).

view

The view command allows the user to display (without running) the individual board tests making up any of the confidence, fault, or peripheral suites. To use it type "view confid", "view fault", "view ptest" or "view ptesti" and the appropriate menu will be displayed. Select a suite by entering its number, and the suite will be displayed in multiple board test format.

slctdev

The slctdev command allows the user to display and reconfigure the SCSI devices. To use it type "slctdev" and the current SCSI configuration will be displayed. Each time Return is pressed, the configuration will be displayed and the user can select a different SCSI device from the menu of supported devices for the SCSI target displayed. Entering "q" will exit the slctdev program. Entering "b" will restart the slctdev program at SCSI target 0. The SCSI configuration will be redisplayed before the program is exited allowing the user to verify any changes made.

gotobug

The gotobug command allows the user to return to the service menu or to the BUG prompt, depending on the processor board environment.

At this point, any BUG command can be executed. The system should be reset before attempting to reboot after entering BUG.

3.6.5 SSID Making the Test Selection

The home menu, "/" allows selection of several types of tests.

Each selection displays another menu. Test selections depends on the system problem.

CONFIDENCE TESTING is selected to verify total system health.

This is useful at initial system installation, and after a major system component replacement.

FAULT testing is used to test and diagnose specific system failures.

For example, if OS panicked or displayed a memory fault, you would select the OS panic test or a memory fault test.

BOARD TESTING is selected to verify operation of a specific board in the system. This is convenient after an individual board is replaced.

PERIPHERAL TESTING is used to test and diagnose the winchester, floppy, or tape devices attached to the system.

3.6.6 Summary of SSID Tests and Diagnostics

TEST TYPE	APPROXIMATE TIME	LOOP-BACK CABLE	WRITE-ENABLED MEDIUM
<u>Confidence Test Suites</u>			
Quick System Check with Comm.	30 sec. - 3 min.	yes	yes
Quick System Check without Comm.	30 sec. - 3 min.	-	yes
Continuous Running Check with Comm.	user-determined	yes	yes
System Installation Check with Comm.	30 min. - 1 hour	yes	yes
<u>Fault Test Suites</u>			
OS System Panic	10 - 35 min.	-	yes
System Halt	10 - 35 min.	-	yes
Memory Fault	2 - 15 min.	-	-
Disk Fault	45 min. - 1 hour	-	-
Tape Fault	1 hour	-	yes
Communication Fault	5 - 10 min.	yes	--
<u>Board Tests</u>			
Processor	depends on test(s) chosen	-	-
Interactive Memory Tests	"	-	-
MVME320 Wini Floppy Controller	"	-	some tests
MVME323 ESDI Disk Drive Controller	"	-	-
MVME327 SCSI Controller	"	-	some tests
MVME330 LAN Controller	"	-	-
MVME332 8 Port Comm. Board	"	yes	-
MVME332XT 8 Serial/1 Par. Port Comm.Contr.	"	yes	-
MVME333 WAN Controller	"	yes	-
MVME333X25 X25 Comm. Controller	"	yes	-
MVME335 Async Comm. Controller	"	yes	-
MVME336 Delta Link Async Comm. Contr.	"	yes	-
MVME350 Streaming Tape Controller	"	-	some tests
MVME355 9-Track Tape Controller	"	-	some tests
MVME360 SMD Hard Disk Controller	"	-	-
MVME374 LAN Controller	"	-	-
MVME393 HiRes Graph. Controller	"	-	some tests
MVME050 Utility Board	"	-	-
<u>Peripheral Test Suites</u>			
Winchester Drive**	45 min. - 1 hour	-	-
SCSI-Devices (some are DESTRUCTIVE)	"	-	yes
SMD Drive	35 min. - 1 hour	-	-
Floppy Disk (DESTRUCTIVE)	15 minutes	-	yes
1 4" Streaming Tape Drive (DESTRUCTIVE)	1 hour	-	yes
9-Track Tape Drive (DESTRUCTIVE)	35 min. - 1 hour	-	yes
ESDI Drive	1 hour	-	-

* The board must be connected to Ethernet coax via transceiver/tap to run test a.

** Format must include bad track list for software bad track support.

3.6.7 Supported Boards

Possible boards are:

BOARD	FUNCTION	MAX. CNT
MVME131DOF	MC68020, 16Mhz, MMB851, MC68881	1
MVME131XT	MC68020, 16Mhz, MMB851, Cache MC68881	1
MVME132DOF	MC68020, 16Mhz, MC68851, PMMU MC68881	1
MVME132XT	MC68020, 16Mhz, MC68851, PMMU Cache, MC68881	1
MVME134	MC68020, 16Mhz, MC68851, PMMU, MC68881, 4Mb DRAM	1
MVME141	MC68030, 25/33/50Mhz, MC68882, Cache	1
MVME147(S)	MC68030, 20/25/32Mhz, MC68882, 4/8/16/32Mb DRAM	1
MVME147SRF	MC68030, 16Mhz, MC68881, 4Mb DRAM	1
MVME187	MC88100, 2 MC88200, 25MHz	1
MVME188(A)	1/2/4 MC88100, 4/8 MC88200, 16Mb DRAM, 20/25MHz	1
MVME204-2/-2F	2Mb DRAM	4
MVME205	Clearpoint 4Mb ECC DRAM	*
MVME224-2	8Mb Parity Memory	*
MVME224A-2 3/4	8/16/32Mb Parity Memory	*
MVME257B/C	16/32Mb Parity Memory on the MVME187 RISC Processor	1
MVME288	16Mb or 64MB Parity Memory on the MVME188 RISC Proc.	4
MVME320	Winchester / Floppy Disk Controller	2
MVME323	ESDI Disk Controller	1
MVME327A	SCSI Controller	1
MVME330A	OfficeLAN XNS Ethernet Controller	1
MVME330B	RFS Ethernet LAN Controller	1
MVME332	8-port RS-232 Async Communications Controller	4
MVME332XT	8-serial/1-parallel port Async Communications Controller	4
MVME333	Synchronous Communications Controller (WAN)	1
MVME333X25	X.25 Communications Controller	1
MVME335	4-port RS-232 plus Parallel Port Comm. Controller	1
MVME336	DeltaLink™ Controller	1
MVME338	Terminal I/O Subsystem	4
MVME350	Streaming Cartridge Controller	1
MVME355	9-Track Tape Controller	1
MVME374	LAN Controller	1

- * The following limitations are valid for SSID R3V5.1:
 If MVME330 installed, a max. of 12Mb of memory can be tested with SSID.
 If MVME320 installed, but no MVME330 a max. of 16Mb can be tested with SSID.
 If no MVME320 and no MVME330 are installed a max. of 40Mb of memory can be tested with SSID.

3.7 OPERATING SYSTEM-BASED TERMINAL AND PRINTER DIAGNOSTICS (TPD)

3.7.1 Starting TPD

The TPD field support manual provides additional and more detailed information. In this section only essential information is given.

1. The system must be 'alive' and operating under Unix operating system 5.3
2. Type: /diag/tpd CR
3. This will present the following menu:

Terminal/Printer Diagnostics Rev. 2.01

COMMAND	ACTION
HE	display this main menu
DV	select device name
DP	define protocol of device
ST	select type of device to diagnose
SD	select/perform diagnostic function
DS	display current device setup
PD	set protocol display option
CV	number conversion utility
EX	exit terminal/printer diagnostics
(DEL)	= keyboard abort (interrupt)
(CONTROL-D)	= temporary shell

<TPD>: ----

↑
type in one of the items mentioned above

3.7.2 Using TPD

CAUTION: Under no circumstances designate the control terminal as the device to be diagnosed and/or tested.

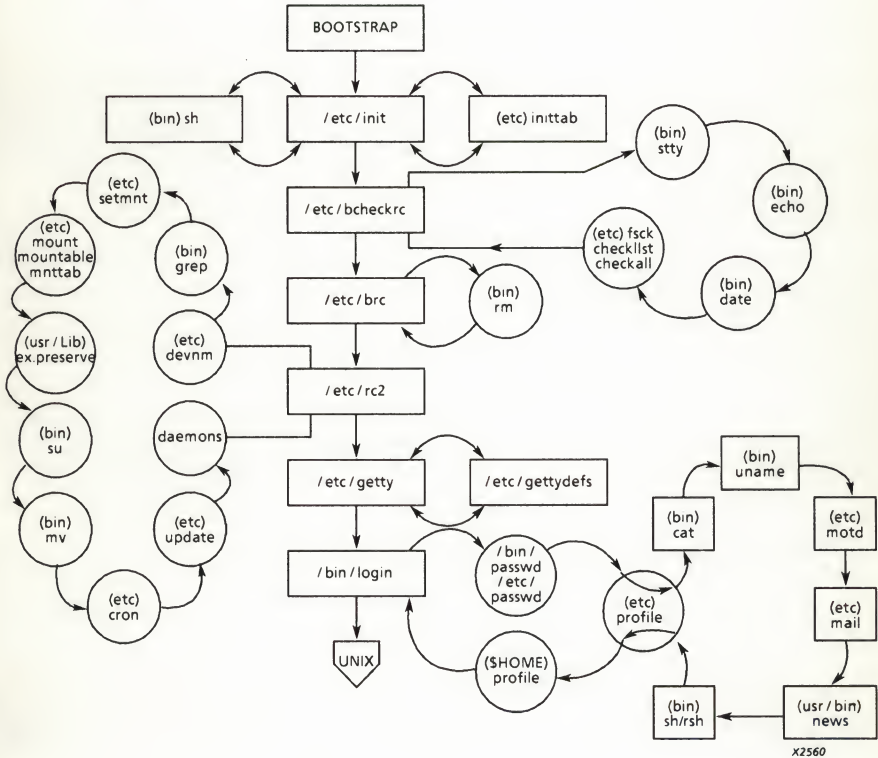
1. In order to execute diagnostic functions under TPD, the device to be tested must be functioning already!.
2. Most of the TPD commands are also available under Unix (like: tty, stty, who etc.) and under the Firmware Debugging Packages (Like dc).
3. Except TPD there are other and equally powerful possibilities to test and diagnose terminals and printers.

3.8 PREVENTIVE MAINTENANCE

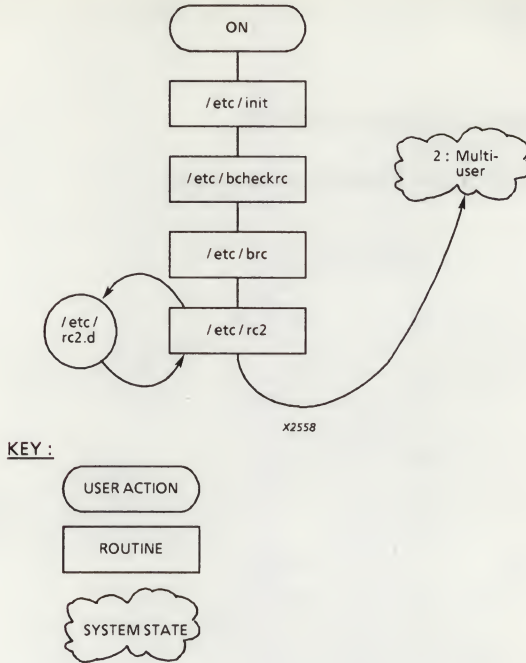
For Preventive Maintenance of the Printers: See chapter 20 and/or Relevant Printer Documentation.

3.9 CORRECTIVE MAINTENANCE

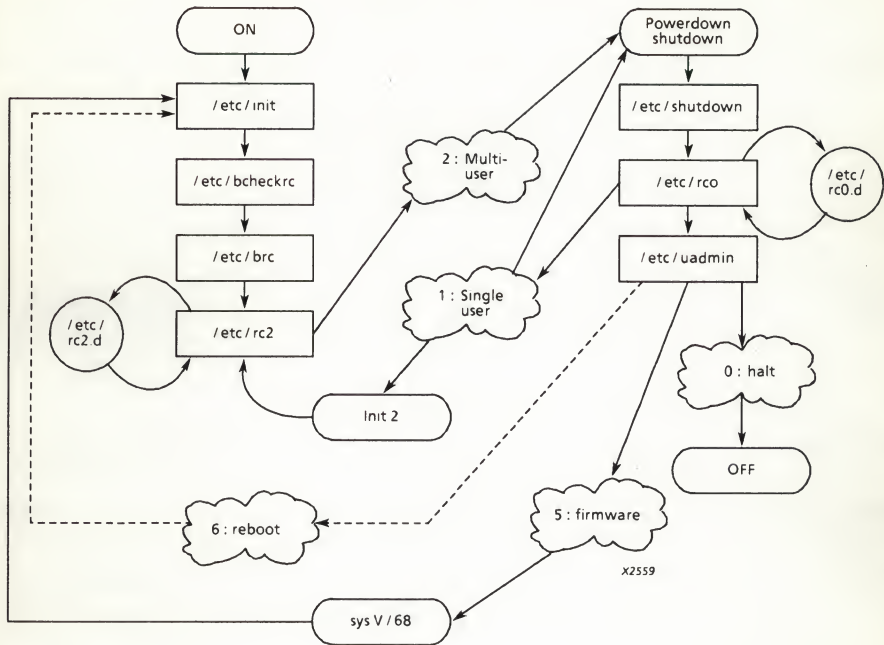
3.9.1 System Trouble Shooting Flowchart



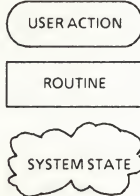
3.9.2 Entering Run Level 2 (Multi-User)



3.9.3 System Life Cycle



KEY :



3.9.4 Administrative Directories and Files

Root Directories

The directories of the root file system (/) are basically as follows:

backups	Directory that contains the executable and control files for the backup/restore facility.
bin	Directory that contains public commands.
dev	Directory containing special files, and sub-directories containing special files, that define all of the devices on the system.
etc	Directory that contains administrative programs, tables, and sub-directories.
install	Directory used by the System Administrative Menu package to mount utilities packages for installation and removal (install file system).
lib	Directory that contains public libraries.
lost + found	Directory used by fsck (1M) to save disconnected files. This directory should be checked regularly by the system administrator.
stand	Directory that contains the copy of the operating system loaded by the disk-based boot loader.
tmp	Directory used for temporary files, cleaned up during boot.
usr	Directory used to mount the usr file system.

Important System Files

The following files and directories are important in the administration of your computer.

/etc/checklist	File used to define a default list of file system devices to be checked by /etc/fsck .
/etc/fstab	File used to specify the file system(s) to be mounted by /etc/mountall and remote file systems to be mounted by /etc/rmountall . Also used by mount (1M).
/etc/gettydefs	File containing information used by /etc/getty to set the speed and terminal settings for a line.
/etc/group	File describing each group to the system.
/etc/init.d	Directory containing files used in upward and downward transitions to all system run levels. These files are linked to files beginning with S (start) or K (stop or kill) in /etc/rcn.d , where <i>n</i> is replaced by the appropriate run level.
/etc/inittab	File containing the instructions to define the processes created or terminated by /etc/init for each initialization state..

/etc/motd	File containing a brief Message of the Day, output by /etc/profile .
/etc/passwd	File identifying each user to the system.
/etc/profile	File containing the standard (default) environment for all users.
/etc/rc0	File executed by /etc/shutdown that executes shell scripts in the /etc/rc0.d directory for transitions to system run levels 0, 5, and 6.
/etc/rc0.d	Directory containing files executed by /etc/rc0 for transitions to system run levels 0, 5, and 6. Files in this directory are linked to files in the /etc/init.d directory and begin with either a K or an S . K indicates processes that are stopped, and S indicates processes that are started when entering run levels 0, 5, or 6.
/etc/rc2	File executed by /etc/init that executes shell scripts in /etc/rc2.d on transitions to system run level 2.
/etc/rc2.d	Directory containing files executed by /etc/rc2 for transitions to system run levels 2 and 3. Files in this directory are linked to files in the /etc/init.d directory and begin with either a K or an S . K indicates processes that should be stopped and S indicates processes that should be started when entering run levels 2 or 3.
/etc/rc3	File executed by /etc/init that executes shell scripts in /etc/rc3.d on transitions to system run level 3 (Remote File Sharing state).
/etc/rc3.d	Directory containing files executed by /etc/rc3 for transitions to system run level 3 (Remote File Sharing mode). Files in this directory are linked to the /etc/init.d directory and begin with either a K or a S . K indicates processes that should be stopped, and S indicates processes that should be started when entering run level 3.
/etc/rstab	File used to specify the Remote File Sharing resources from your machine that are automatically offered to remote machines upon entering system run level 3 (Remote File Sharing state).
/etc/shutdown	File containing a shell script that gracefully shuts down the system in preparation for system backup or for scheduled downtime.
/etc/TIMEZONE	File used to set the time zone shell variable TZ.
/etc/utmp	File containing the information on the current run state of the system.
/etc/wtmp	File containing a history of system logins. This file should be checked periodically, by the system administrator, for size.
/usr/adm/sulog	File containing a history of su command usage. This file should be checked periodically for size.
/usr/lib/cron/log	File containing a history of all the actions taken by /etc/cron . This file should be checked periodically, by the system administrator, for size.

/usr/lib/help/HELPLOG

File containing a history of all the actions taken by **/usr/bin/help** (if it is enabled on the system).

/usr/lib/spell/spellhist

File containing a history of all words that **spell** fails to match (if the Spell Utilities are installed on the system).

/usr/news

Directory containing news files. This directory should be checked periodically, and old files should be discarded.

/usr/options

Directory containing files that identify the utilities that are installed on the system.

/usr/spool/cron/crontabs

Directory containing crontab files for the **adm**, **root**, and **sys** logins and ordinary users listed in **cron.allow**.

3.9.5 Performance Problems

1. Performance management procedures are considered to be the System Administrator's task!.
2. In the System V/68 Release 3 System Administrator's Guide (Chapter 6), the ways to monitor and change the computer system's performance are explained in detail.

3.9.6 Hardware Dumps

See chapter 1 (Dump memory to tape)

3.9.7 Software Dumps

See chapter 1 (cpio to back up files)

3.10 ERROR MESSAGES

3.10.1 Processor Firmware Error Messages

3.10.1.1 Processor Debugger Error Messages

DEBUGGER ERROR MESSAGES	MEANING
Bad VID Block	The Volume Identifier on the boot disk is damaged or not present. The boot sequence aborts.
Concurrent Mode Already Active	Error message when trying to activate an active system in CM command. (MVME18x)
Concurrent Mode Not Active	Error message when trying to deactivate an inactive system in NOCM command. (MVME18x)
Concurrent Mode Setup Failure	Error in establishing communications with port/device in CM command. (MVME18x)
Concurrent Mode Terminated With Failure	Error, closing communications link in NOCM command.. (MVME18x)
Error Status: XXXX	Disk communication error status word when IOP command, or .DSKRD or .DSKWR TRAP #15 functions, are unsuccessful. Refer to chapter 3, Device Communication Status Codes for Details.
*** Illegal argument ***	Improper argument in known command.
*** Illegal option ***	Improper option in known command.
Invalid command	Unknown command
Invalid LUN	Controller and device selected during IOP or IOT command do not correspond to a valid controller and device.
*** Invalid Range ***	Range entered wrong in BF, BI, BM, BS, or DU commands.
*** Missing Argument ***	Necessary field was not entered.
NON-EXISTENT MNEMONIC	Entry error in MM command with DI option
NON-EXISTENT OPERAND	Entry error in MM command with DI option
Long Bus Error	Message displayed when using an unassigned or reserved function code or mnemonic.
<i>part of s-record data</i>	Printed out if non-hex character is encountered in data field in LO or VE commands.
RAM FAIL AT \$XXXXXXXX	Parity is not correct at address \$XXXXXXXX during a BI command.
STATUS No error since start of program Upload of S-Records complete.	Message from VERSAdos UPLOADS utility after successful DU command.
STRING POOL FULL, LAST LINE DISCARDED.	String pool size (511 characters) is exceeded during MA command.
The following record(s) did not verify SNXXXXYYAAAAA..... ZZ CS	Failure during the LO or VE commands. ZZ is the non-matching byte and CS is the non-match checksum.
<i>unassembled line</i> -----^	Message and pointer ("^") to field of suspected error when using ;DI option in MM command.
*** Unknown Field ***	
Verify passes	Successful VE command.

3.10.1.2 Processor Diagnostics Error Messages

DIAGNOSTICS ERROR MESSAGES	MEANING
Addr = XXXXXXXX Except = YYYYYYYY Read = ZZZZZZZZ	Error message in all MMU tests except A, B, and 0. XXXXXXXX, YYYYYYYY, and ZZZZZZZZ are hex numbers
Battery low (data may be corrupted)	Power-up test error message.
N CACHE (HITS/MISSES!) CACHED IN XXXX MODE, RERAN IN XXXX MODE FAILED	MC68030 Cache Tests error message, where N is a number and XXXX is SUPY or USER.
CPU Addressing Modes test failed	Power-up test error message.
CPU Instruction test failed	Power-up test error message.
CPU Register test failed	Power-up test error message.
Date read was xx/xx/xx, should be 01/01/00	RTC Test error message.
Day of week not 1	RTC Test error message.
Exception Processing test failed	Power-up test error message.
Expect = XXXXXXXX Read = YYYYYYYY	Error message in MMU A or B tests. XXXXXXXX or YYYYYYYY are hex numbers.
FAILED	Error message in non-verbose (NV) mode.
Failed <i>name</i> addressing check	MPU Address Mode Test error message, <i>name</i> is the particular addressing mode(s) whose test(s) failed.
Failed <i>name</i> instruction check	MPU Instruction Test error message, <i>name</i> is the particular instruction(s) whose test(s) failed.
Failed <i>name</i> register check	MPU Register Test error message, <i>name</i> is the particular register(s) whose test(s) failed.
FC TEST ADDR 1098765432109876543 2109876543210 EXPECTED READ N NNNNNNNN ----- ---X-X----- NNNNNNNN NNNNNNNN	Error message display format for Memory Tests E - J, where the N's are numbers.
Got Bus Error when reading from ROM	Bus Error Test error message.
Hit page Missed page Modified page	Error messages in MMU 0 test.
Insufficient Memory PASSED	Memory Test I Program Test error message when the range of memory selected is less than 388 bytes and the program segment cannot be copied into RAM.
No Bus Error when (writing to/reading from) BAD address space	Bus Error Test error message.
No FPC detected	FPC Test error message when there is no FPC on the module.
MMU does not respond	MMU Test error message when the MMU fails/does not respond.
Non-volatile RAM access error	Power-up test error message.
PASSED	Successful test message in non-verbose (NV) mode.
RAM test failed	Power-up test error message.
ROM test failed	Power-up test error message.
Test failed FPC routine at \$XXXXXXXX	FPC Test error message. \$XXXXXXXX is address of part of test that failed.
Test Failed Vector # XXX	MPU Exception Processing Test error message. # XXX is the exception vector offset.

Firmware Diagnostics Error Messages (continued)

DEBUGGER ERROR MESSAGES	MEANING
Time read was xx:xx:xx, should be 00:00:01	RTC Test error message.
Unexpected Bus Error	MPU Address Mode, MFP Functionality, RTC, or Z8530 Functionality Test error message.
Unexpected exception taken to Vector # XXX	MPU Exception Processing Test error message, # XXX is the exception vector offset.
Unexpected interrupt	FPC Test error message.

3.10.1.3 Other Error Messages from the Firmware

OTHER MESSAGES	MEANING
141-Bug >	Debugger prompt.
141-Diag >	Diagnostic prompt.
At Breakpoint	Indicates program has stopped at breakpoint.
Auto Boot from controller X, device Y, STRING	Message when Autoboot is enabled by AB command. X and Y are hex numbers; STRING is an ASCII string.
Autoboot in progress . . . To Abort hit (BREAK)	If Autoboot is enabled, this message is displayed at Power-Up informing user that Autoboot has begun.
!!Break!!	BREAK key on console has stopped operation.
CMMU 0 Supervisor Data Cache is OFF CMMU 0 Supervisor Code Cache is OFF CMMU 0 User Data Cache is OFF CMMU 0 User Code Cache is OFF	Messages after CT OFF command
CMMU 0 Supervisor Data Cache is ON CMMU 0 Supervisor Code Cache is ON CMMU 0 User Data Cache is ON CMMU 0 User Code Cache is ON	Messages after CT ON command
(Clock is in Battery Save Mode)	Message output when PS command halts the RTC oscillator.
COLD start	Vectors have been initialized.
Data = \$XX	XX is truncated data cut to fit data field size during BF or BV commands.
Effective address : XXXXXXXX	Exact location of data during BF, BI, BM, BS, BV, DU, and EEP commands; or where program was executed during GD, GN, GO, and GT commands.
Effective count : &XXX	Actual number of data patterns acted on during BF, BI, BS, BV, or EEP commands; or the number of bytes moved during DU command.
Escape character : \$HH = AA	Exit code from transparent mode, in hex (HH) and ASCII (AA) during TM command.
Initial data = \$XX, increment = \$YY	XX is starting data and YY is truncated increment cut to fit data field size during BF or BV commands.
- last match extends over range boundary -	String found in BS command ends outside specified range.
Logical unit \$XX unassigned	Message that may be output during PA or PF commands. \$XX is a hex number indicating the port involved.

3.10.1.3 Other Error Messages from the Firmware (Cont'd)

OTHER MESSAGES	MEANING
M =	Prompt for macro definitions during MA command
NO MACRO DEFINED	Trying to list macros by MA command when there are none.
No Auto Boot from controller X, device Y, STRING	Message when Autoboot is disabled by NOAB command. X and Y are hex numbers; STRING is an ASCII string.
No printer attached	Message that may be output during NOPA command.
- not found -	String not found in BS command.
OK to proceed (y/n)?	"Interlock" prompt before configuring port in PF command.
Press "RETURN" to continue	Message output during BS or HE command when more than 24 lines of output are available.
ROM boot disabled	Message output when NORB command disables ROMboot function.
UPLOAD "S" RECORDS Version x.y Copyrighted by MOTOROLA, INC. volume = xxxx catlg = xxxx file = FILE1 ext = MX	Message from VERSAdos UPLOADS utility during DU command.
WARM start	Vectors have not been initialized.
Weekday xx/xx/xx xx:xx:xx:	Day, date, and 24-hours time presentation during SET and TIME commands.

3.10.2 Device Communication Status Codes

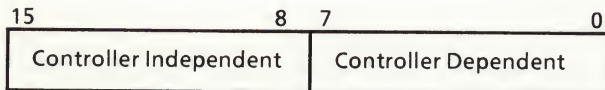
For every disk access under the Processor Firmware Debugging Package (for instance **iop**, **bo**), a **status word** is returned, the so called **Error Status**. If this Error status is non zero, it will be echoed on the console.

Example:

```
130Diag> iop
Controller LUN = 00?
Device LUN = 00?
Read/Write/Format = R?
Memory Address = 0003000?
Starting Block = 0000D000? FFFFFFFF
Number of Blocks = 0010?
Address Modifier = 00?
Error Status: 5000
```

The **most significant byte** of the Error Status word reflects **Controller Independent status**. This part of the status is generated by the software or firmware. The **least significant byte** reflects **Controller Dependent status**. This part of the status is generated by the disk controller.

The layout of this **Error Status word** is shown below:



layout of the Error Status Word

The **Controller Independent Error Status codes** are:

ERROR CODE	DESCRIPTION
S00	No error detected
S01	Invalid controller type
S02	Invalid controller LUN
S03	Invalid device LUN
S04	Controller initialization failed. Controller already attached
S05	Descriptor table not found
S06	Invalid command packet
S07	Invalid address for transfer
S08	Block conversion error
S09	Invalid parameter in configuration
S0A	Transfer data count mismatch error
S0B	Invalid status received in command packet
S50	Block conversion error

Controller Independent Error Codes

3.10.2.1 Device Communication Status Codes for the MVME147

Intermediate Return Codes

CODE	MEANING	NOTES
S00	Good return code	(1)
S01	Wait for interrupt; command door closed. No new commands may be issued to firmware. Okay to send new commands when multiple caller rules.	(1)
S02	Wait for interrupt; command door open. OK to send new commands for other devices to firmware.	(1)
S03	Link flag received.	(1)
S04	A message has been received. User must interpret	(1)

Table 1: Meaning of status code in STAT1 if bit 7 of STAT0 is 1.

Final Return Codes

CODE	MEANING	NOTES
S00	GOOD. Script processing OK	(2)
S01	Undefined problem.	(2)
S02	Reserved.	(2)
S03	Interrupt handler was entered with no pending IRQ (SFFFE0788)	(2)
S04	Reselection not expected from this TARGET.	(2)
S05	TARGET thinks it is working on linked commands but the command table does not.	(2)
S06	Linked command has error status code; command has been aborted.	(2)
S07	Received an illegal message.	(2)
S08	The message we have tried to send was rejected.	(2)
S09	Encountered a parity error in data-in phase, command phase (TARGET only), status phase, or message-in phase. (Refer to bits 15-12 of second status word).	(2)
S0A	SCSI bus RESET received.	(2)
S0B	Command error (bad command code, bad timing, or command door was closed when a command was received) = 00. Custom SCSI sequence: controller level not equal to "117 local level", or interrupt not on. Format: format with defects on a controller type not supported. Controller reset: controller not SCSI type. Space (tape): undefined mode. Mode select (tape): undefined controller type. Mode sense (tape): undefined controller type.	(2)
S0C	Size error (invalid format code).	(2)
S0D	Bad ID in packet or local ID (SFFFE07A6).	(2)
S0E	Error in attach (not previously attached, bad device LUN, unsupported controller, target SCSI address conflicts with initiator).	(2)
S0F	Busy error (device has a command pending)	(2)
S10	There is disagreement between initiator and TARGET regarding the number of bytes that are to be transferred. If bit 15 of status = 1, then bits 12-14 contain the phase code.	(2)
S11	Received a BERR* while in DMA mode from a device that did not respond fast enough. The controller must be capable of moving data at least 10 kilobytes per second in DMA mode.	(2)
S12	Selection time-out. TARGET does not respond.	(2)
S13	SCSI protocol violation. Controller reset: controller not SCSI.	(2)

Table 2: Meaning of status code in STAT1 if bit 7 of STAT0 is 0.

Final Return Codes (Continued)

CODE	MEANING	NOTES
\$14	Script mismatch. CHECK STATUS. If SCSI status within Command Table (offset \$14 for custom sequence, otherwise \$64) is zero, then assume script mismatch, otherwise use SCSI packet status.	(2)
\$15	Script mismatch. The TARGET sequence of operation did not match the script.	(2)
\$16	Illegal SCSI state machine transition.	(2)
\$17	Command has been received (in TARGET role)	(2)
\$18	Script complete in TARGET role.	(2)
\$19	Script complete and new command loaded (TARGET role).	(2)
\$1A	TARGET module called. TARGET role not supported.	(2)
\$1B	TARGET module rejected an initiator message and returned with this status to a particular LUN service routine.	(2)
\$1C	TARGET module sent a check status with an "illegal request" sense block to some initiator because the particular LUN that the initiator wanted was not enabled.	(2)
\$1D	TARGET module sent a busy status to the calling initiator because the particular LUN that the initiator wanted was already busy servicing a command.	(2)
\$1E	Reserved and unused.	(2)
\$1F	Reserved.	(2)

Request-Sense-Data Error-Class 7 Codes (Controller-Dependent)

\$20	NO SENSE. Indicates that there is no specific sense key information to be reported for the designated logical unit.	(2, 3)
\$21	RECOVERED ERROR. Indicates that the last command completed successfully with some recovery action performed by the TARGET. Details can be determined by examining the additional sense bytes and information bytes.	(2, 3)
\$22	NOT READY. Indicates that the logical unit addressed cannot be accessed. Operator intervention may be required to correct this condition.	(2, 3)
\$23	MEDIUM ERROR. Indicates that the TARGET detected a non-recoverable condition that was probably caused by a flaw in the medium or an error in recording data.	(2, 3)
\$24	HARDWARE ERROR. Indicates that the TARGET detected a non-recoverable hardware failure (for example, controller failure device failure, parity error, etc). while performing the command or during self test.	(2, 3)
\$25	ILLEGAL REQUEST. Indicates that there was an illegal parameter in the command descriptor block or in the additional parameters supplied as data.	(2, 3)
\$26	UNIT ATTENTION. Indicates that the removable media may have been changed or the TARGET has been reset.	(2, 3)
\$27	DATA PROTECT. Indicates that a command that Reads or Writes the medium was attempted on a block that is protected from this operation.	(2, 3)
\$28	BLANK CHECK. Indicates that a write-once read-multiple device or a sequential access device encountered a blank block while reading or a write-once read-multiple device encountered a nonblank block while writing.	(2, 3)
\$29	VENDOR UNIQUE. Used for reporting vendor unique conditions	(2, 3)
\$2A	COPY ABORTED. Indicates that a copy or a copy and verify command was aborted due to an error condition.	(2, 3)
\$2B	ABORTED COMMAND. Indicates that the TARGET aborted the command. The initiator may be able to recover by trying the command again.	(2, 3)
\$2C	EQUAL. Indicates a search data command has satisfied an equal comparison.	(2, 3)

Table 2 : Meaning of status code in STAT1 if bit 7 of STAT0 is 0. (Cont'd)

Final Return Codes (Continued)

Request-Sense-Data Error-Class 7 Codes (Controller-Dependent) (Cont'd)

CODE	MEANING	NOTES
\$2D	VOLUME OVERFLOW. Indicates that a buffered peripheral device has reached an end-of-medium and data remains in the buffer that has not been written to the medium. A recover buffered data command may be issued to read the unwritten data from the buffer.	(2, 3)
\$2E	MISCOMPARE. Indicates that the source data did not match the data read from the medium.	(2, 3)
\$2F	RESERVED. This sense key is reserved.	(2, 3)

SCSI Status Returned in Status Phase

\$31	SCSI status = \$02. CHECK.	(2, 4)
\$32	SCSI status = \$04. CONDITION MET.	(2, 4)
\$34	SCSI status = \$08. BUSY.	(2, 4)
\$38	SCSI status = \$10. INTERMEDIATE / GOOD.	(2, 4)
\$3A	SCSI status = \$14. INTERMEDIATE / CONDITION MET / GOOD.	(2, 4)
\$3C	SCSI status = \$18. RESERVATION CONFLICT.	(2, 4)

Request-Sense-Data Error-Classes 0-6 Codes (Controller-Dependent)

\$40	NO ERROR STATUS	(2,5,6)
\$41	NO INDEX SIGNAL	(2,5,6)
\$42	NO SEEK COMPLETE	(2,5,6)
\$43	WRITE FAULT	(2,5,6)
\$44	DRIVE NOT READY	(2,5,6)
\$45	DRIVE NOT SELECTED	(2,5,6)
\$46	NO TRACK 00	(2,5,6)
\$47	MULTIPLE DRIVES SELECTED	(2,5,6)
\$49	CARTRIDGE CHANGED	(2,5,6)
\$4D	SEEK IN PROGRESS	(2,5,7)
\$50	ID ERROR, ECC error in the data field	(2,5,7)
\$51	DATA ERROR. Uncorrectable data error during a read	(2,5,7)
\$52	ID ADDRESS MARK NOT FOUND	(2,5,7)
\$53	DATA ADDRESS MARK NOT FOUND	(2,5,7)
\$54	SECTOR NUMBER NOT FOUND	(2,5,7)
\$55	SEEK ERROR	(2,5,7)
\$57	WRITE PROTECTED	(2,5,7)
\$58	CORRECTABLE DATA FIELD ERROR	(2,5,7)
\$59	BAD BLOCK FOUND	(2,5,7)
\$5A	FORMAT ERROR. (Check track command)	(2,5,7)
\$5C	UNABLE TO READ ALTERNATE TRACK ADDRESS	(2,5,7)
\$5E	ATTEMPTED TO DIRECTLY ACCESS AN ALTERNATE TRACK	(2,5,7)
\$5F	SEQUENCER TIME OUT DURING TRANSFER	(2,5,7)
\$60	INVALID COMMAND	(2,5,8)
\$61	ILLEGAL DISK ADDRESS	(2,5,8)
\$62	ILLEGAL FUNCTION	(2,5,8)
\$63	VOLUME OVERFLOW	(2,5,8)
\$70	RAM ERROR. (DTC 520 B OR DB)	(2,5,9)
\$71	FDC 765 ERROR. (DTC 520 B OR DB)	(2,5,9)

Table 2 : Meaning of status code in STAT1 if bit 7 of STAT0 is 0. (Cont'd)

- NOTES:**
1. *Intermediate return codes. Bit 15 = 1, actual word = \$80xx, \$90xx, etc.*
 2. *Final return codes.*
 3. *Sense key status codes for request-sense-data error -- class 7.
An offset of \$20 is added to all sense key codes.*
 4. *The SCSI status sent from the controller is ANDed with \$1E, shifted right one bit, and \$30 added.*
 5. *Sense key status codes for request-sense-data error -- classes 0-6. An offset of \$40 is added to all sense key codes.*
 6. *Drive error codes.*
 7. *Controller error codes.*
 8. *Command errors.*
 9. *Miscellaneous errors*

3.10.2.2 MVME187 SCSI Firmware Status Codes

The lower Controller Dependent byte is formed from selecting one of two bytes (the SIOP Status (SCSI Input Output Processor Status) or SCSI Bus Status) of error information. The precedence by which one of the two bytes is selected is:

- SCSI Bus Status returned is non-zero, return the SCSI Status byte and throw away the SIOP Status byte.
- SCSI Bus Status returned is zero, return the SIOP Status byte.

CODE	MEANING SCSI Bus Status
\$00	Good completion
\$02	Check condition
\$04	Condition met good
\$08	Busy
\$10	Intermediate good
\$14	Intermediate condition met good
\$18	Reservation conflict
\$22	Command terminated
\$28	Queue full

CODE	MEANING SIOP Status
\$04	Command aborted - abort message
\$05	Command aborted - abort tag message
\$06	Command aborted - Clear queue message
\$07	Data overflow - too much data
\$08	Data underrun - not enough data
\$09	Clock faster than 75MHz
\$0A	Bad block parameter - ASCII clock value Zero or Non-ASCII
\$0B	Queue depth too large (> 255)
\$0C	Selection timeout
\$0D	Reselection timeout
\$0E	Bus error during a data phase
\$0F	Bus error during a non-data phase
\$10	Illegal NCR script instruction
\$11	Command aborted - unexpected disconnect
\$12	Command aborted - unexpected phase change
\$13	SCSI bus hung during command
\$14	Data phase not expected by user
\$15	Data phase was in wrong direction
\$16	Incorrect phase following select
\$17	Incorrect phase following message-out
\$18	Incorrect phase following data
\$19	Incorrect phase following command
\$1A	Incorrect phase following status
\$1B	Incorrect phase following read pointer message
\$1C	Incorrect phase following send data pointer message
\$1D	No identify message after re-selection
\$1E	SIOP failed during script patching
\$1F	SIOP not attached to the SCSI bus

3.10.2.3 Device Communication Status Codes for the MVME320

CODE (HEX)	ERROR DESCRIPTION
\$00	Correct execution without error
\$01	Non-recoverable error which cannot be completed (auto retries were attempted).
\$02	Drive not ready
\$03	Reserved
\$04	Sector address out of range
\$05	Throughput error (floppy data overrun)
\$06	Command rejected (illegal command)
\$07	Busy (controller busy)
\$08	Drive not available (head out of range)
\$09	DMA operation cannot be completed (VMEbus error)
\$0A	Command abort (reset busy)
\$0B-\$FF	Not used

3.10.2.4 Device Communication Status Codes for the MVME323

CODE (HEX)	ERROR DESCRIPTION	CODE (HEX)	ERROR DESCRIPTION
10	Disk not Ready	41	Not Used
12	See Error	42	GAP Specification Error
13	ECC Error-Data Field	4B	Seek Error
14	Invalid Command Code	50	Sectors/Track Error
15	Illegal Fetch and Execute	51	Bytes/Sector Spec Error
16	Invalid Sector in Command	52	Interleave Spec Factor
17	Illegal Memory Type	53	Invalid Head Address
18	Bus Timeout	54	Invalid Cylinder Address
19	Header Checksum Error	55	ESDI Command Complete Timeout
1A	Disk Write Protected	5D	Invalid DMA Transfer Count
1B	Unit not Selected	60	IOPB Failed
1C	Seek Error Timeout	61	DMA Failed
1D	Fault Timeout	62	Illegal VME Address
1E	Drive Faulted	6A	Unrecognized Header Field
1F	Ready Timeout	6B	Mapped Header Error
20	End of Medium	6E	Spare Sector Spec. Error
21	Translation Fault	6F	No Spare Sector Enable
22	Invalid Header Pad	77	Command Aborted
23	Uncorrectable Error	78	ACFAIL Detected
24	Translation Error, Cylinder	80	XFer Assertion Timeout
25	Translation Error, Head	81	XFer Release Timeout
26	Translation Error, Sector	82	Status Assertion Timeout
27	Data Overrun	83	Status Release Timeout
28	No Index Pulse on Format	A0	S/G List Too Large
29	Sector Not Found	A1	Illegal Element Byte Count
2A	ID Field Error, Wrong Head	AB	Illegal Element Size
2B	Invalid Sync in Data Field	AC	Illegal List Byte Count
2C	No Valid Header Found	AD	Illegal IOPB Sector Byte Count
2D	Seek Timeout Error	C0	Both Bits Set
2F	Not on Cylinder	C1	MSE Without Initialize Long
30	RTZ Timeout	F0	Mapped Header
31	Invalid Sync in Header	F1	Sector not Flagged
3E	UIB Skew Factor	FC	No Write List
3F	No Heads Specified	FD	No Write Buffers
40	Unit not Initialized	FE	Out of Buffers
		FF	Command not Implemented

3.10.2.5 Device Communication Status Codes for the MVME327A

CODE (HEX)	ERROR DESCRIPTION	NOTES
\$00	Good	1

\$01-0F Command Parameter Errors

\$01	bad descriptor	2,3
\$02	Bad command	2,3
\$03	Unimplemented command	
\$04	Bad drive	3
\$05	Bad logical address	3
\$06	Bad scatter / gather table	
\$07	Unimplemented device	
\$08	Unit not initialized	3

\$10-1F Media Errors

\$10	No ID found on track	3
\$11	Seek error	3
\$12	Relocated track error	3
\$13	Record not found, bad ID	3
\$14	Data sync fault	3
\$15	ECC error	3
\$16	Record not found	3
\$17	Media error	3

\$20-2F Drive Errors

\$20	Drive fault	3
\$21	Write protected media	3
\$22	Motor not on	3
\$23	Door open	3
\$24	Drive not ready	3
\$25	Drive busy	3

\$30-3F VME DMA Errors

\$30	VMEbus error	3,4
\$31	Bad address alignment	3
\$32	But time-out	3
\$33	Invalid DMA transfer count	3

Device Communication Status Codes for the MVME327A (continued)

\$40-4F Disk Format Errors

CODE (HEX)	ERROR DESCRIPTION	NOTES
\$40	Not enough alternates	3
\$41	Format failed	3
\$42	Verify error	3
\$43	Bad format parameters	3
\$44	Cannot fix bad spot	3
\$45	Too many defects	3

\$80-FF MVME327A Specific Errors

\$80	SCSI error, additional status available	3
\$81	Indeterminate media error, no additional information	3
\$82	Indeterminate hardware error	3
\$83	Blank check (EOD or corrupted WORM)	3
\$84	Incomplete extended message from target	3,5
\$85	Invalid reselection by an unthreaded target	3,5
\$86	No status returned from target	3,5
\$87	Message out not transferred to target	3,5
\$88	Message in not received from target	3,5
\$89	Incomplete data read to private buffer	3
\$8A	Incomplete data write from private buffer	3
\$8B	Incorrect CDB size was given	3,5
\$8C	Undefined SCSI phase was requested	3,5
\$8D	Time-out occurred during a select phase	3
\$8E	Command terminated due to SCSI bus reset	3
\$8F	Invalid message received	3,5
\$90	Command not received	6
\$91	Unexpected status phase	3
\$92	SCSI script mismatch	3,5,9
\$93	Unexpected disconnect caused command failure	3
\$94	Request sense command was not successful	10
\$95	No write descriptor for controller drive	7
\$96	Incomplete data transfer	3
\$97	Out of local resources for command processing	11
\$98	Local memory resources lost	
\$99	Channel reserved for another SCSI device	12
\$9A	Device reserved for another SCSI device	12
\$9B	Already enabled, expecting target response	6
\$9C	Target not enabled	6
\$9D	Unsupported controller type	7
\$9D	Unsupported peripheral device type	7
\$9F	Block size mismatch	8

Device Communication Status Codes for the MVME327A (continued)

CODE (HEX)	ERROR DESCRIPTION	NOTES
\$A1	Invalid head number in format defect list	7
\$A2	Block size mismatch - - nonfatal	8
\$A3	Our SCSI ID was not changed by command	13
\$A4	Our SCSI ID has changed	6,14
\$A5	No target enable has been completed	6
\$A6	Cannot do longword transfers	7
\$A7	Cannot do DMA transfers	7,8
\$A8	Invalid logical block size	7
\$A9	Sectors per track mismatch	7
\$AA	Number of heads mismatch	7
\$AB	Number of cylinders mismatch	7
\$AC	Invalid floppy parameter(s)	
\$AD	Already reserved	12
\$AE	Was not reserved	12
\$AF	Invalid sector number	7
\$CC	Self test failed	
NOTE	A "longword" in the M6800 CISC systems has the same size as a "word" in the M88000 RISC systems	

- NOTES:**
1. The termination transfer count is always valid for a command that transfers data.
 2. The bad byte is indicated by its offset value in status parameter 3. If the value is -1 (\$FFFF) then the bad byte is not indicated.
 3. Additional status information may be available in the additional error code/status field of the BPP packet.
 4. VMEbus error address contained in error status address field of BPP packet is currently not valid.
 5. SCSI processing may not have finished. A SCSI bus reset command may need to be executed to put the SCSI bus in a known state. Refer to caution regarding SCSI bus resets.
 6. Target mode only.
 7. Designated parameter is in error.
 8. Block size requested does not correspond to block size of device.
 9. Target device did not behave as indicated by the script in the SCSI specific packet.
 10. Error condition flagged by target device cannot be reported. Probably due to a hardware problem.

11. *Command cannot be executed because local resources required exceed available local resources. Resubmit command when MVME327A is less busy.*
12. *Valid for the reserve/release commands.*
13. *Set SCSI address command was unsuccessful because at least one SCSI command was in progress.*
14. *Set SCSI address command was issued and all pending target wait commands were returned. Set SCSI address command may or may not be successful.*

3.10.2.6 Device Communication Status Codes for the MVME328

Because of the nature of the MMVME328 Dual SCSI Host Adapter, additional status may be returned. The additional error consists of two bytes, the first one is the SCSI command that was issued in which a Sense Key was returned. The second byte is the SCSI Sense Key which is returned.

CODE (HEX)	ERROR DESCRIPTION MACSI/Controller Error Codes
\$00	Good status
\$01	Queue full
\$02	Work queue initialization error
\$03	First command error
\$04	Command code error
\$05	Queue number error
\$06	Queue already initialized
\$07	Queue initialized
\$08	Queue mode not ready
\$09	Command unavailable
\$0A	Priority error

CODE (HEX)	ERROR DESCRIPTION General Error Code Information
\$10	Reserved field error
\$11	Reset bus status
\$12	Secondary port unavailable
\$13	SCSI ID error
\$14	SCSI bus reset status
\$15	Command aborted by reset
\$16	Page size error
\$17	Invalid command tag
\$18	Busy command tag

CODE (HEX)	ERROR DESCRIPTION VMEbus Errors
\$20	VMEbus error
\$21	VMEbus timeout
\$22	Not used
\$23	VMEbus illegal address
\$24	VMEbus illegal memory type
\$25	Illegal count specified
\$26	VMEbus fetch error
\$27	VMEbus fetch timeout
\$28	VMEbus post error
\$29	VMEbus post timeout
\$2A	VMEbus illegal fetch address
\$2B	VMEbus illegal post address
\$2C	VMEbus scatter/gather fetch
\$2D	VMEbus scatter/gather timeout
\$2E	Invalid scatter/gather count

CODE (HEX)	ERROR DESCRIPTION SCSI Errors
\$30	SCSI selection timeout error
\$31	SCSI disconnect timeout error
\$32	Abnormal SCSI sequence
\$33	SCSI disconnect error
\$34	SCSI transfer count exception
\$35-4F	Not used
\$40	Illegal scatter/gather count
\$41	Illegal scatter/gather memory type
\$42	Illegal scatter/gather address

CODE (HEX)	ERROR DESCRIPTION Error Handling Codes
\$50	Read/write buffer count error
\$51	Illegal read/write
\$80	Flush on error in progress
\$81	Flush work queue status
\$82	Missing command
\$83	Counter exhausted
\$84	Data direction error

CODE (HEX)	ERROR DESCRIPTION Printer Port Errors
\$90	Printer status change
\$91	Printer count too short
\$92	Bad data length field
\$93	Printer unavailable
\$99	Scatter/gather selected for printer port

CODE (HEX)	ERROR DESCRIPTION Other Errors
\$C0	Bad IOPB type
\$C1	IOPB timeout error

3.10.2.7 Device Communication Status Codes for the MVME350

CODE (HEX)	ERROR DESCRIPTION
\$00	Correct execution without error
\$01	Block in error not located
\$02	Unrecoverable data error
\$03	End of media
\$04	Write protected
\$05	Drive offline
\$06	Cartridge not in place
\$0D	No data detected
\$0E	Illegal command
\$12	Tape reset did not occur
\$17	Timeout
\$18	Bad drive
\$1A	Bad command
\$1E	Fatal error

3.10.3 Error Messages Under SSID

The explanation of error messages under SSID is given in the Stand Alone System Interactive Diagnostics User's Guide. See also the SSID online documentation.

3.10.4 Error Message Under UNIX

Error Messages under UNIX can be divided into several classes:

- System V/68 or V/88 Error Messages
This type of error messages ALWAYS appear on the console. They tell the system administrator something on the system status.
- System V/68 or V/88 Call Error Messages
An error occurring in any normal user program may give this error message.
- Error Messages from a certain application, like the LP spooler or the cu/uucp package.

All of these messages are explained in Appendix C of the System Administrator Guide.

Sometimes System V/68 Error Messages give a **Fatal error status**.

Example:

FATAL ERROR on MVME327 ctl 0, SCSI ctl 3, drive 0, slice 0.

Fatal error status: 0x8D.

This Fatal error status 0x8D can be explained using the table from chapter 3, Device Communication Status Codes for the MVME327.

For the meaning of the Fatal error status see the previous sections.

0x8D means: Time-out occurred during a select phase.

3.10.5 UNIX Error Logging

UNIX keeps track of a number of error types by logging them in an error file.

To check error logging, the following commands can be used:

sysadm diskreport

errpt (see also chapter 1, Error Logging)

The meaning of the data given in the error codes is controller dependent.

A general error record looks like

```
Mxxx      Error Logged On Thu Sep 8 01:45:42 1988

Minor Device Number      0x1
Logical Device           8 (10)
Device Address           0006257C
Retry Count              0
Error Diagnosis          Unrecovered
Simultaneous Bus Activity M320

Registers at Error time
      ----
      ----
      ----
      ----
      ----

Physical Buffer Start Address 0010BC00
Transfer Size in Bytes      1024
Type of Transfer            Read
Block No. in Logical File System 17106
I/O Type                    Physical

Block Offset of I/O        0

Statistics on Device to date:
R/W Operations             1
Other Operations           0
Unrecorded Errors          0
```

The meaning of the items are:

Mxxx

This tells you which controller this error is about.

Possibilities are M147, M187, M320, M323, M327, M328, M350 and M355.

Error Logged On

Gives the time the error occurred. This is especially important if the error is intermittent. By comparing the time of different error-records you can try to find out what the reason of the error might be.

Minor Device Number

The meaning of this field is unknown at this moment.

Logical Device

The number is the Minor number.

This number is used by the device driver to select a particular drive specific function.

Per device driver, the meaning of this number may differ.

In case of a disk driver the minor number is often used to select one of the connected disk drives and one of the slices on that drive.

For tape drivers, the minor number is often used to specify a certain type of action, for instance rewind/no rewind, append/no append, truncate/no truncate.

The value between brackets is the octal representation, while the other value gives the decimal representation.

You can find the minor numbers in the /dev directory or subdirectories.

Device Address

The device address is not of interest for us.

Retry Count

This number gives the number of times the driver tried to do the same operation.

If, for instance, the error was caused by an ECC-error on disk, the diskdrive will try to read that same block of data again. This is tried again until the read was successful or until it is tried as many times given by the retry count.

Error Diagnosis

Recovered is not interesting. An example is a read error which succeeded after retries.

Unrecovered indicates a real problem.

Simultaneous Bus Activity

During the error some other controller may have been using the bus too.

Registers at Error Time

When a command is given to a controller, for instance a read command the controller needs to know what disksector it has to read, where to place the information in memory. But it also has to know the disk parameters, such as number of heads, cylinders, sectors/track, etc.

All these parameters are placed in a packet, the so called command packet. This packet is then transferred to the controller.

In this packet, there is also some space for some status information. As soon as the controller has finished the command, it will give back some status, such as "command completed without Errors", "Drive not Ready", etc.

A part of this packet is echoed in the error file.

Physical Buffer Start Address

This is the place in memory where the data is read from or written to.

So, if you do a write on disk, and the operation completes successfully, this Buffer Start Address would give you the memory address where that data can be found.

Transfer Size in Bytes

The amount of information that is transferred during each single transfer, or the so called Buffersize.

Type of Transfer

This field tells you whether the actual operation performed when the error occurred, was a read, a write or a format.

Block No. In Logical File System

This number gives the block number (in blocks of 512 bytes) where the error occurred.

The meaning of this field is related to the Logical Device-field.

If you decoded from the Logical Device-field that the error occurred on disk 1, of the MVME320, slice 2, the Block No. In Logical System tells you where on that slice the error occurred.

I/O Type

Depending on the major number, the operation causing the error was on the Physical (raw) or the Buffered (block) device.

Block Offset of I/O

The meaning of this field is not known yet, it seems to be unimportant.

Statistics on Device to Date

For each physical unit (disk, tape), I/O statistics are kept.

Primary purpose is to establish an indication of error rates during error logging.

So, these fields give the number of Read/Write, other operations (such as formatting) and Errors which are for some reason not logged in the error file.

3.10.5.1 UNIX START/STOP Record

Every time UNIX is powered down or started up, a record is entered in the error file. Such a start record tells you the time the system was started up or stopped.

A UNIX START record looks like

ERROR LOGGING SYSTEM STARTED - Fri Jul 15 05:15:35 1988

System Profile:

UNIX/R3V3 Operating System (sysV68)
Motorola MC68020 Processor

A UNIX STOP record looks like

ERROR LOGGING SYSTEM SHUTDOWN - Fri Sep 9 07:14:01 1988

3.10.5.2 Error Record for the MVME147

M147 Error Logged On Mon Sep 19 10:10:21 1988

SCSI Device Number	50
Logical Device	6 (06)
Device Address	0008AB18
Retry Count	0
Error Diagnosis	Unrecovered
Simultaneous Bus Activity	None

Registers at Error time

DEV	0500
STAT0:1	0012
BUF HI	0005
LO	0001
BLK HI	0001
LO	000a
CNT HI	0000
LO	0000
SCA/GAT	0000
	1208
CTL:CMD	0028
ILV:VCT	024d
STAT2:3	8000
	000a
	0200
	0000
WRP PTR	0008
	c938
UTAB	0005
	99ea
INT SVC	0002
	1482
	0000
	0000
	0000
DEVICE	0000

Physical Buffer Start Address	00166C00
Transfer Size in Bytes	96
Type of Transfer	Write
Block No. in Logical File System	0
I/O Type	Physical

Block Offset of I/O	0
---------------------	---

Statistics on Device to date:

R/W Operations	20
Other Operations	35
Unrecorded Errors	0

The meaning of the fields in this error report are:

SCSI Device Number

gives the SCSI address and drive number.

In our systems, the SCSI address is the same as the controller number on the SCSI-bus. In that case: 00 till 30 is FIXED DISK,

40 and 50 is STREAMER / 9-TRACK TAPE,

60 is FLOPPY.

The drive number is always zero.

Logical Device

The Logical Device is the so-called minor number. The decoding of this field is controller dependent.

The value between brackets is the octal representation of this field, while the other value gives the decimal representation.

The decimal value, can be found in the /dev directory. (See also chapter 3, Relations CTRL. LUN, DEV. LUN)

The octal number is used for decoding. The decodation differs for disks, tapes and floppies:

bit 0-3	Disks	slice number			
	Tapes	bit 0	set:	No Rewind on end of operation	
			Not set:	Rewind on end of operation	
		bit 1	set:	Append	
			Not set:	Truncate	
		bit 2	set:	No Retension before operation	
			Not set:	Retension before operation	
		bit 3	Always zero		
		Start/stop devices (9-track tape)			
		bit 0	set:	No Rewind on end of operation	
			Not set:	Rewind on end of operation	
	bit 1	set:	High speed		
		Not set:	Low speed		
	bit 2	set:	High density		
	Not set:	Low density			
	bit 3	Always zero			
bit 4	If set, device is a floppy				
bit 5-7	Logical Unit Number of that drive at that SCSI address. These bits are always 0.				

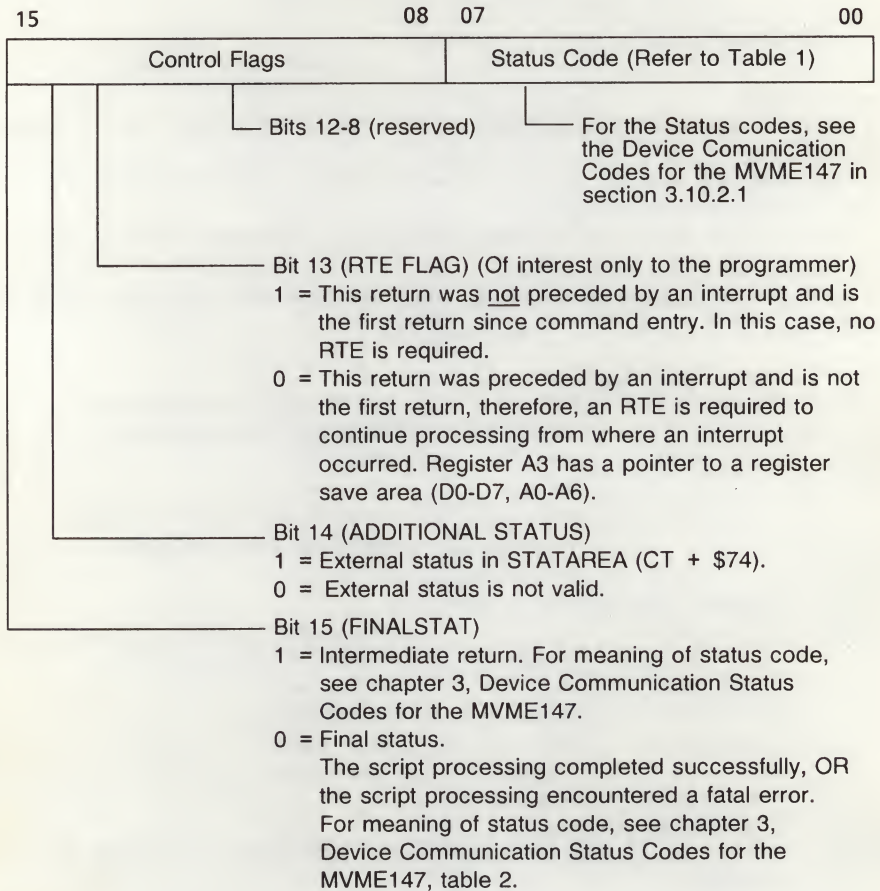
Registers at Error Time

- **DEV** gives the SCSI address (upper byte) and the device no. (lower byte).
The SCSI address gives the address of that device on the SCSI-bus.
The device no. must always be zero.

- **STAT0:1**, first 2 status bytes.

When a command has been completed, it will return a number of status words, namely STAT0:1 and STAT2:3.

The high-order byte of STAT0:1 gives some flags, while the low order byte gives a status code.



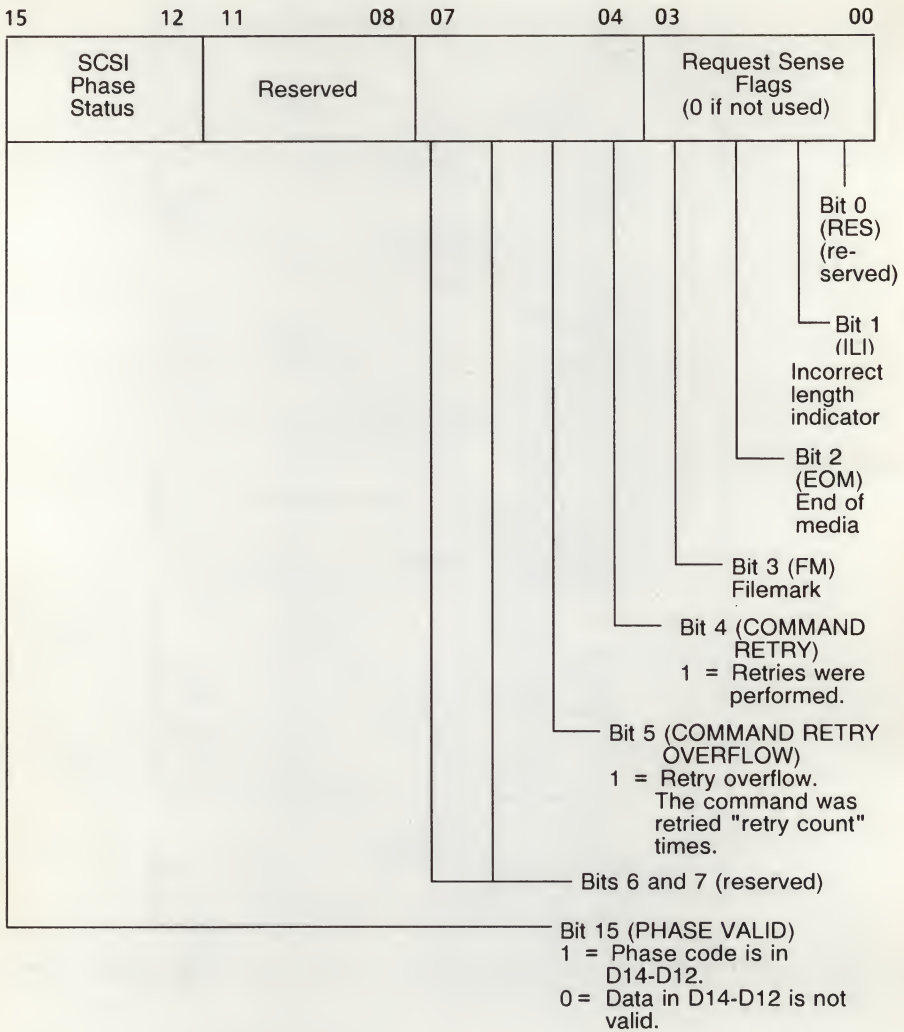
- **CTL:CMD**

CMD gives the command byte, according to:

\$00	Read
\$04	Write
\$08	Disk attach
\$0C	Detach (all devices)
\$10	Format (with/without defect list)
\$14	Assign Alternate Sector (SCSI)
\$18	Reserved
\$1C	Custom SCSI Sequence
\$20	SCSI Bus Reset
\$24	SCSI Controller Reset
\$28	Tape Attach
\$2C	Erase
\$30	Rewind
\$34	Read Block Limits
\$38	Space (blocks, filemarks, end)
\$3C	Write Filemarks
\$40	Verify CRC
\$44	Tape Mode Select
\$48	Tape Mode Sense
\$4C	Set Parameters
\$50	Inquiry
\$54	Load/Unload
\$58	Recover Buffer Data
\$5C	Request Sense Data
\$60	Request Status
\$64	Reserve Device
\$68	Release Device
\$6C	New tape attach
\$70	New read (disk and tape)
\$74	New write (disk and tape)
\$78	New disk attach
\$7C	Open (read of first blocks of a device)

The meaning of the CTL (Command Control) byte is depending on the command byte.

- **STAT2:3** gives the status bytes 2 and 3



Block No. In Logical File System

This number gives the block number (in 512byte blocks) where the error occurred. The meaning of this field is related to the Logical Device-field.

If you decode from the Logical Device-field that the error occurred on disk 1, MVME147, slice 2. The Block No. In Logical File System tells you where on that slice 2 the error occurred.

Explanation of the given error record:

The first thing to look at is the controller type (MVME147) and the Error Diagnosis (Unrecovered). Unrecovered means that it was not possible for the controller or the driver to complete the command successfully, so this is a real error situation.

The Type of Transfer is Write, while the I/O type is Physical, so on the raw-device. The peripheral type can be subtracted from the SCSI Device Number. In this error record it is 50, so the SCSI Address of this peripheral is 5. By default this is a tape, but to be sure you can find this in the system configuration tables in sysgen.

Now the Logical Device-field is used to decode the way the tape was accessed.

In this error record it is octal 06 = 000 110 binary, which says that the Write-operation was done in the append mode, with rewind on end of operation and no retention before operation.

The error-position is given by the Block No. in Logical File System-field, so the error occurred at the beginning of the tape.

The Registers at Error time give :

- DEV 0500

So the SCSI address of the peripheral was 05, with device 00.

- STAT0:1 0012

STAT0 equals 00. This item must be bit decoded:

Final error status (so we must use the second table in section 3.10.2.1, Device Communication Status Codes for the MVME147, for the meaning of the status code in STAT1), External status is not valid and this return was preceded by an interrupt.

STAT1 equals 12.

Second table in section 3.10.2.1 says that this means Selection time-out. TARGET does not respond. So the tape did not respond when it was accessed. This means that the tapedrive was not available or did not have power.

- CTL:CMD 0028

CMD 28 means Tape Attach

- STAT2:3 8000

STAT2:3 are bit decoded.

Only bit 15 is set, which means that the SCSI Phase code can be found in bit 14 to 12 of this status word. The meaning of the SCSI Phase is unknown at the moment.

3.10.5.3 Error Record for MVME320

M320 Error Logged On Thu Sep 8 01:45:42 1988

Minor Device Number	0x1
Logical Device	8 (10)
Device Address	0006257C
Retry Count	0
Error Diagnosis	Unrecovered
Simultaneous Bus Activity	M320

0 = drive 0
8 = drive 1
16 = floppy 0

Registers at Error time

CMD:MST	0210
EXTSTAT	0400
REQUEST	0000
ACTUAL	8a88
EC0:EC1	0005

Physical Buffer Start Address	0010BC00
Transfer Size in Bytes	1024
Type of Transfer	Read
Block No. in Logical File System	17106
I/O Type	Physical

Block Offset of I/O	0
---------------------	---

Statistics on Device to date:

R/W Operations	1392
Other Operations	2
Unrecorded Errors	0

See also chapter 3 UNIX Error Logging

Logical Device

The Logical Device is the so-called minor number. The decoding of this field is controller dependent.

For the MVME320, it is used by the driver to select a specific unit (disk) and a specific slice on that disk.

The value between brackets is the octal representation of this field, while the other values are given in decimal representation. The decimal value can be found in the /dev directory. (See also 3.11).

The octal number is used for decoding, according to the following rule:

bit 0 to 2 = Partition number or Slice (0-7)

bit 3 to 4 = Unit Number:

Unit 0, 1 Winchester Disk. Unit 2, 3 Floppy Disk

? 65 3 2 10
4A 0-7
9202

bit 5 = Controller number
 0 is first MVME320 controller. 1 is second MVME320 controller

Registers at Error time

These fields are taken from the packet that describes all parameters necessary to execute a certain command. The important items are:

- **CMD:MST**

means the Command Code and Main Status code according to the following tables:

Command Codes

VALUE	COMMAND
0x0	Recalibrate to track zero
0x1	Write deleted data
0x2	Verify
0x3	Transparent sector read
0x4	Read Identifier
0x5	Read Multiple sector with overlapped seek
0x6	Write Multiple sector with overlapped seek
0x7	Format a track

For the Main Status, see chapter 3, Device Communication Status Codes for the MVME320.

- **EXTSTAT**

value of the extend status register. Indicates the reason of the error.

Extend Status bits (16 bits)

BIT		VALUE IN HEX
0	Write fault	0001
1	CRC or ECC error	0002
2	Data overrun	0004
3	No ID found	0008
4	Not ready	0010
5	Deleted data address mark	0020
6	Write on protected diskette	0040
7	Positioning error	0080
8	Data port time out	0100
9	Disk format error	0200
10	Uncorrectable data error (ECC)	0400
11	Drive not available and command stop	0800
12	Drive type rejected	1000
13	Positioning time out	2000
14	Wrong ID Data-ID sequence during read track	4000
15	Bus error fault	8000

Block No. In Logical File System

This number gives the block number (in 512byte blocks) where the error occurred.

The meaning of this field is related to the Logical Device-field.

Decoding the Logical Device-field results in; error occurred on disk 1, slice 2. The Block No. In Logical File System tells you where on that slice 2 the error occurred.

Explanation of the given error record:

The first thing to look at is the controller type (MVME320) and the Error Diagnosis (Unrecovered). Unrecovered means that it was not possible for the controller or the driver to complete the command succesfully, so a real error situation.

The Type of Transfer is Read, while the I/O type is Physical, so on the raw-device.

The disk unit where the error occurred, is decoded from the Logical Device-field, which is octal 10=001 000 binary, which says that the error occurred on the second disk of the first MVME320, slice 0.

The error-position on this slice is given by the Block No. in Logical File System-field, so at the 17106th block of 512 bytes.

The Logical Device-field and the Block No. in Logical File System-field are used when redirection is required.

The Registers at Error time give:

- CMD:MST 0210
CMD 02 is a Verify, which checks if the data on that position on the disk is valid, so if the data does not give ECC-errors. No data is transferred to memory.
MST 10 is not used.
- EXTSTAT 0400 says that the error was an uncorrectable data error (ECC)

3.10.5.4 Error Record for MVME323

M323 Error Logged On Thu Sep 8 01:46:21 1988

Minor Device Number	0x17
Logical Device	23 (27)
Device Address	00067F94
Retry Count	4
Error Diagnosis	Unrecovered
Simultaneous Bus Activity	None

Registers at Error time

BUFF-HI	0000
BUFF-LO	0000
D01STAT	00d1
D23STAT	0000
CSR	e050
CMD : OPT	8113
STA : ERR	821b

Physical Buffer Start Address	0010C400
Transfer Size in Bytes	0
Type of Transfer	Read
Block No. in Logical File System	0
I/O Type	Physical
Block Offset of I/O	0

Statistics on Device to date:

R/W Operations	1
Other Operations	1
Unrecorded Errors	0

Most labels are described in chapter 3, UNIX Error Logging.
The meaning of some important labels are:

Logical Device

The Logical Device is called the minor number. The decoding of this field is controller dependent.

For the MVME323, it is used by the driver to select a specific unit (disk) and a specific slice on that disk.

The value between brackets is the octal representation of this field, while the other value gives the decimal representation.

The decimal value, can be found in the /dev directory. (See also 3.11)

The octal number is used for decoding, according to the following rule:

bit 0 to 3 = Partition number or Slice (0-7)

bit 4 to 5 = Unit Number

So, 27 octal = 0 1 0 1 1 1 binair = device 1 (2nd ESDI disk) slice 7

Registers at Error Time

- **D01STAT** and **D23STAT**

Give the status of drive 0 to 3 of the MVME323.

But be aware!!! D01STAT = 0x00d1 means that the Status of Drive 0 = 0xd1 and the Status of Drive 1 = 0x00.

The meaning of the drive status per drive is:

Description of Status:

Bit #	
7	Unit Ready
6	Unit Present (selectable)
5	Seek Error
4	Command Complete
3	Fault
2	Attention
1	Write Protected
0	Drive Ready

- **CSR** means Control and Status register.

The meaning of this register is according to:

BIT	NAME	MEANING
15	SLED	If this bit is zero, the on board status LED is red, unless the MVM323 is accessing the disk, in which case the LED is green. When '1' the LED is always green provided the BOARD-bit is '1'
14	BOARD ok	If '1', this bit indicates that power up diagnostics were completed successfully. Otherwise this bit will be '0'.
13	SYSFAIL ENABLE	Used to enable the MVME323 to drive the SYSFAIL signal to the MVME bus
12	BOARD CLEAR	If the host sets this bit to '1' and holds it '1' for at least one microsecond this will cause a hardware reset of the controller.
11	ABORT	
10, 9	RESERVED	
8	BUSS-ERROR	The MVME323 sets this bit if a buss error occurred.
7	Go/Busy	The host sets this bit in order to activate a command.
6	OPER DONE	This bit is set to 1 on a command completion.
5	STAT CHG	Indicates a change in one of the status bits
4	ERROR LAST COMMAND	The MVME323 sets this bit to 1 if an error occurred during the last command. Otherwise it is set to 0.
3	STAT CHG SOURCE	This bit indicates which drive was responsible for generating an interrupt. If '1', drive one generated the interrupt. If '0', drive zero generated the interrupt. If more than two ESDI drives are used, this bit is NOT used.
2,1,0	Reserved	Must be 0.

- **CMD:OPT** is the command code and command options.
The command codes are:

CODE	COMMAND	CODE	COMMAND
70	Diagnostics	8B	Reformat
71	Read Long	8C	Format Track with Data
72	Write Long	90	Map Sector
74	Read Header	91	Read Sectors Sequential
75	Read ESDI Flaw Map	92	Write Sectors Sequential
76	Read CDC ESDI Flaw Map	93	Verify Sectors Sequential
77	Report Configuration	94	Read Noncached
78	Write Sector Buffer	95	Read Seq., Disable Addr. Bump
79	Read Sector Buffer	96	Write Seq., Diss Addr. Bump
7A	Report Sector ID	97	Clear Drive Fault
7B	Format with Sector ID	99	Verify Track
7C	Initialize Long	9A	Track ID
7D	Report Config. Long	9B	Fetch and Execute IOPB
80	Write After Cache	9C	Verify Track Sequential
81	Read Sector(s)	9E	Extended Diagnostics
82	Write Sector(s)	A0	ESDI Pass-Through
83	Verify Sector(s)	A1	Read and Scatter
84	Format Track	A2	Gather and Write
85	Map Track	A3	Read and Scatter 32
86	Handshake	A4	Gather and Write 32
87	Initialize	A5	Read and Scatter 32 (List 2)
89	Restore (Return to 0)	A6	Gather and Write 32 (List 2)
8A	Seek		

The command options tell the MVME323 the options for the execution of the specified command. This field is not explained here.

- **STA:ERR** is the Command Status and Error Code.
The Status-field tells the driver what the execution-status of the last command is.
The Status Codes are:

CODE	MEANING
80	Command completed with no error
81	Command in progress: command is currently being executed.
82	Command completed with error.
83	Command completed with exception. The command is completed successfully, but some method of error recovery was required.

If the STAT-field equals 82, the last command is completed with an error, then the ERR-field tells the driver what error occurred while executing the last command.

The meaning of the ERR-field can be found in chapter 3, Device Communication Status Codes for the MVME323.

If the STAT-field equals 83, the last command is completed with an exception. In this case ERR-field gives the exception code.

Error codes

BIT	MEANING
7	If set, error correction was applied to the data field.
6	If set, data transferred to system memory may be erroneous.
5	Reserved.
4	If set, Restore and Reseek was performed.
3-0	Number of rotational retries that was attempted.

Block No. In Logical File System

This number gives the block number (in 512byte blocks) where the error occurred.

The meaning of this field is related to the Logical Device-field.

If you decode from the Logical Device-field that the error occurred on disk 1, slice 2, the Block No. In Logical File System tells you where on that slice 2 the error occurred.

Explanation of the given error record:

The first thing to look at is the controller type (MVME323) and the Error Diagnosis (Unrecovered). Unrecovered means that it was not possible for the controller or the driver to complete the command successfully, so a real error situation.

The Type of Transfer is Read, while the I/O type is Physical, so on the raw-device. The disk unit where the error occurred, is decoded from the Logical Device-field, which is octal 27 = 010 111 binary, which says that the error occurred on the second disk of, slice 7. Slice 7 indicates the whole disk.

The error-position on this slice is given by the Block No. in Logical File System-field, so at the 0th block of 512 bytes, so at the physical start of the disk.

When redirection is needed, you need the Logical Device-field and the Block No. in Logical File System-field.

The Registers at Error time give

- D01STAT 00D1, so status of first diskdrive is 0xD1 and status of second drive is 0x00.

Status 0xD1 means Drive ready, Not Write Protected, Attention bit not set, No Fault condition, Command Complete, no Seek Error, Unit Present and Unit Ready.

Status 0x00 means Drive not ready, Not Write Protected, Attention bit not set, No Fault condition, No Command Complete, no Seek Error, No Unit Present and No Unit Ready.

From the bits No Unit Present and No Unit Ready, can be concluded that the second drive was not accessible. So that was the reason of the error causing this error record, because the second disk was to be accessed.

- CSR e050 means Status led on, Board is ok, sysfail is enabled, Board is not being reset, No Bus-error, Operation is Done and an error occurred on last command.
- CMD:OPT 8113.
CMD 81 is a Read Sector(s).
- STA:ERR 821B
STA 82 is a Command Completed With Error.
ERR 1B is Unit Not Selected.

3.10.5.5 Error record for the MVME327A

M327 Error Logged On Fri Apr 21 13:38:18 1989

SCSI Device Number	30
Logical Device	0 (00)
Device Address	000BCF94
Retry Count	0
Error Diagnosis	Unrecovered
Simultaneous Bus Activity	M327

Registers at Error time

DEVICE	0300
CMD	002d
FERR:RE	8d00
DEVERR	0000
RETR:RE	0000
ERRSTAT	0000
	0000
TERMCNT	0000
	0000
STAT1	0000
STAT2	0000
STAT3	0000

Physical Buffer Start Address	001AB400
Transfer Size in Bytes	1024
Type of Transfer	Write
Block No. in Logical File System	0
I/O Type	Buffered

Block Offset of I/O	0
---------------------	---

Statistics on Device to date:

R/W Operations	20
Other Operations	8
Unrecorded Errors	0

The meaning of the fields in this error report are:

SCSI Device Number

gives the SCSI address and drive number.

In our systems, the SCSI address is the same as the controller number on the SCSI-bus.

The drive number is always zero.

Logical Device

The Logical Device is the so-called minor number. The decoding of this field is controller dependent.

The value between brackets is the octal representation of this field, while the other value gives the decimal representation.

The decimal value, can be found in the /dev directory. (See also chapter 3, Relation CTRL. LUN, DEV. LUN).

The octal number is used for decoding. The decodation differs for disks, tapes and floppies:

bit 0-3	Disks	slice number	
	Tapes	bit 0	set: No Rewind on end of operation Not set: Rewind on end of operation
		bit 1	set: Append Not set: Truncate
		bit 2	set: No Retension before operation Not set: Retension before operation
		bit 3	Always zero
	Start/stop device		
		bit 0	set No rewind on end of operation not set Rewind on end of operation.
		bit 1	set: High speed Not set: Low speed
		bit 2	set: High density Not set: Low density
		bit 3	Always zero
	Floppy	slice 0	Double Density, slice 0
		slice 3	High Density, slice 0
		slice 4	High Density, slice 7
		slice 7	Double Density, slice 7
bit 4	If set, device is a floppy (this is NOT a SCSI-floppy)		
bit 5-7	Logical Unit Number of that drive at that SCSI address. These bits are always 0.		

Registers at Error Time

- **DEVICE** gives the SCSI address (upper byte) and the device no. (lower byte).
The SCSI address gives the address of that device on the SCSI-bus.
The device no. must always be zero.

- **CMD**

The CMD gives the command (lower byte) and the command control (higher byte).
The meaning of the command control is depending on the command.
The command table is:

CMD	MEANING
00	BPP Test
01	Read
02	Write
03	Read Descriptor
04	Write Descriptor
05	Format
06	Fix Bad Spot
10	Read Status
11	Load/Unload/Re-tension
12	Write Filemark
13	Rewind
14	Erase
15	Space
20	Enable Target
21	Disable target
22	Reserve Unit
23	Release Unit
25	Reset SCSI
26	Custom SCSI Command
27	Self Test
28	Target Wait
29	Target Execute
2B	Set SCSI Address
2D	Open

- **FERR:RE**

RE is the Recovered Error Status. If non-zero, the command is completed successfully after retries.

FERR is the Fatal Error Code. The meaning is according the table in chapter 3, Device Communication Status Codes for the MVME327.

- DEVERR

DEVERR is the Device Error Status. The meaning is according to the following table:

HEX. VALUE	MESSAGE
00	no additional error code
01	no index/sector signal
02	no seek complete
03	write fault
04	drive not ready
05	drive not defined
06	track ZERO not found
07	multiple drives selected
08	logical unit communications failure
09	track following error
0A-0F	are RESERVED
10	ID CRC or ECC error
11	unrecovered READ error
12	no address mark found for ID field
13	no address mark found for data area
14	no record found
15	seek positioning error
16	data synchronization mark error
17	recovered data with target read retries
18	recovered data with ECC correction
19	defect list error
1A	parameter overrun - parameter list too long
1B	synchronous transfer error
1C	primary defect list not found
1D	all bytes did not compare during a VERIFY cmd
1E	recovered ID with ECC correction
1F	is RESERVED
20	invalid command operation code
21	illegal logical block address
22	illegal function for device type
23	is RESERVED
24	illegal field in CDB
25	invalid LUN
26	invalid field in parameter list
27	disk is write protected
28	medium change
29	power on or bus device reset

- ERRSTAT

If a transfer is terminated because of an error, this field has the logical block (or sector) at which the error occurred. Therefore, it must be the same as the Block No. In Logical File System.

HEX. VALUE	MESSAGE
2A	mode select parameters have changed
2B-2F	are RESERVED
30	incompatible cartridge
31	medium format corrupted
32	no defect spare location available
33-3F	are RESERVED
40	RAM failure
41	data path diagnostic failure
42	power on diagnostic failure
43	message reject error
44	internal controller error
45	select/reselect failed
46	unsuccessful 'soft' reset
47	SCSI interface parity error
48	initiator detected error
49	inappropriate/illegal message
4A-4F	are RESERVED
50-5F	are RESERVED
60-6F	are RESERVED
70-7F	are RESERVED
80 through FF are vendor unique error codes	

- **STAT3**

If the Fatal Error Code is 0x02 (bad command), this field contains an offset into the command packet of the offending parameter.

Explanation of the given error record:

The first thing to look at is the controller type (MVME327) and the Error Diagnosis (Unrecovered). Unrecovered means that it was not possible for the controller or the driver to end the command successfully, so this is a real error situation.

The Type of Transfer is Write, while the I/O type is Buffered, so on the block-device. The peripheral type can be subtracted from the SCSI Device Number. In this error record it is 30, so the SCSI Address of this peripheral is 3. By default this is a disk, but to be sure you can find this in the system configuration tables in sysgen.

Now the Logical Device-field is used to decode the way the disk was accessed. In this error record it is hex 0x00 = 0000 0000 binary, which says that the operation was done on slice 0.

The error-position is given by the Block No. in Logical File System-field, which equals 0, so the error occurred at the beginning of slice 0.

The Registers at Error time give

- DEVICE 0300
so the SCSI address of the peripheral was 3.
- CMD 002D
CMD 2D is an Open
- FERR:RE 8d00
FERR 8d is Time-out occurred during a select phase.
So the disk did not respond in time. The disk might not be available or is not receiving power.
RE 00 says that the command is not recovered successfully after retries.
- DEVERR 0000
This one says there is no Device Error Status
- ERRSTAT 0000 0000
So error occurred at begin of slice 0.
- STAT3 0000
This has no meaning here, since FERR is not equal to 0x02.

3.10.5.6 Error record for the MVME328

M328 Error Logged On Thu Nov 14 14:01:25 1991

SCSI Device Number	0
Logical Device	3 (03)
Device Address	001BB190
Retry Count	0
Error Diagnosis	Unrecovered
Simultaneous Bus Activity	None

Registers at Error time

DEVICE	7403
BOFF-HI	0000
BOFF-LO	000c
CSR	d47a
CMD	000f
OPTIONS	0020
SCSICMD	0003
STATUS	0008

Physical Buffer Start Address	0029D800
Transfer Size in Bytes	1024
Type of Transfer	Read
Block No. in Logical File System	67134
I/O Type	Buffered

Block Offset of I/O	840826
---------------------	--------

Statistics on Device to date:

R/W Operations	20559
Other Operations	2
Unrecorded Errors	0

The meaning of some fields in this error report are:

SCSI Device Number

SCSI device number of the drive. The possible numbers are:

- 0 through 6 MVME328 controller 0 SCSI bus 0
- 7 through 13 MVME328 controller 0 SCSI bus 1
- 14 through 20 MVME328 controller 1 SCSI bus 0
- 21 through 27 MVME328 controller 1 SCSI bus 1

Logical Device

The so called minor number in decimal and in octal, the layout is as follows:

- | | |
|-----------|---|
| Bit 0 - 3 | Slice number, running from 0 through 15 |
| Bit 4 - 6 | SCSI number |
| Bit 7 | Bus number, 0 means main board
1 means daughter board. |

Register at error time

CMD

Command Response Status Word (CRSW). The 8 most significant bits are not used, the 8 least significant bits has the following meaning:

- | | |
|-------|---|
| Bit 0 | Command Response Block Valid/Clear Interrupt (CRBV) |
| Bit 1 | Command Complete (CC) is set on command completion, also when the command is completed with an error or exception. |
| Bit 2 | Error (ER) is set by the MVME328 when a command is completed with an error condition such as: <ul style="list-style-type: none">- An incorrectly specified parameter which causes the MVME328 to misinterpret the command.- An invalid address leading to VMEbus errors and VMEbus timeouts.- A faulty device which causes a timeout. |
| Bit 3 | Exception (EX) indicates that an operation was completed with an exception. An exception is not an error, but rather something about the host probably needs to be notified. |
| Bit 4 | Abort Queue (AQ) indicates that a command queue containing some commands is terminated. |
| Bit 5 | Queue Mode Started (QMS) indicates that the MVME328 is in the queue mode as requested by the host. |
| Bit 6 | Command Queue Entry Available (CQA) indicates that there is an entry available in the queue. |
| Bit 7 | Status Change (SC) indicates the following: <ul style="list-style-type: none">- A device has connected of another type as requested for.- A command to the MVME328 has timed out.- A device is requesting more data to be transferred than the command to the MVME328 allows.- A device is requesting a data transfer of the opposite direction specified by the command to the MVME328. |

OPTIONS

Command Code, which are:

- ```

20 SCSI pass through commands
21 SCSI pas through extended commands
22 SCSI reset bus
40 Perform diagnostics
41 Initialize controller
42 Initialize work queue
43 Dump initialisation parameters
44 Dump work queue parameters
49 Flush work queue

```

**SCSICMD** SCSI command options, depending on the type of command in use.

**STATUS** Returned status, the meaning is as follows:

Bit 0 through 7 contains the error code, see table below.

Bit 8 through 15 contains the SCSI status byte from the target drive.

| Error Code<br>Hex. value | Error description<br>MACSI Controller error codes                          |
|--------------------------|----------------------------------------------------------------------------|
| 00                       | Good status                                                                |
| 01                       | The work queue specified for this command is full                          |
| 02                       | Work queue initialisation error                                            |
| 03                       | First command error, the first command should be an initialisation command |
| 04                       | Command code error, invalid command type                                   |
| 05                       | Queue number error                                                         |
| 06                       | Queue already initialized                                                  |
| 07                       | Queue uninitialized                                                        |
| 08                       | Queue mode not ready                                                       |
| 09                       | Command unavailable, command not implemented                               |
| 0B                       | Invalid burst command, requested burst size is odd or is greater than 256  |

| Error Code<br>Hex. value | Error description<br>General error code information                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10                       | Reserved field error, a reserved field in the IOPB has non zero data in it                                                                                                                            |
| 11                       | Reset bus status, the SCSI reset IOPB has executed successfully and has resetted the bus                                                                                                              |
| 12                       | Secondary port unavailable                                                                                                                                                                            |
| 13                       | SCSI ID error, the requested SCSI ID is the ID of the MVME328                                                                                                                                         |
| 14                       | SCSI bus reset status. The command could not be executed because the bus is held in the reset state. This may be caused by an unpowered device on the bus, improper termination, or an inverted cable |
| 15                       | Command aborted by reset. The command is aborted by a SCSI reset                                                                                                                                      |
| 16                       | Page size error. The page size specified in the Controller Initialization Block should be 0                                                                                                           |
| 17                       | Invalid command tag. Command tag must be non-zero                                                                                                                                                     |
| 18                       | Busy command tag. The command is on the bus                                                                                                                                                           |



| Error Code<br>Hex. value | Error description<br>VMEbus errors                                                                                                                                                                         |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20                       | VMEbus error occurred during the DMA transfer of the data                                                                                                                                                  |
| 21                       | VMEbus time out, indicating that the VMEbus acquisition was not completed within the programmed time                                                                                                       |
| 23                       | VMEbus illegal address. For 16-bit transfers the starting address must fall on a word boundary (even address). For a 32-bit transfer the starting address must fall on a longword boundary (multiple of 4) |
| 24                       | VMEbus illegal memory type                                                                                                                                                                                 |
| 25                       | Illegal count specified. Transfer length specified is not an even number. All transfer counts must be even since the MVME328 can perform only word or longword transfers.                                  |
| 26                       | VMEbus fetch error. VMEbus error during an offboard fetch                                                                                                                                                  |
| 27                       | VMEbus fetch timeout. Timeout occurred on an offboard fetch                                                                                                                                                |
| 28                       | VMEbus post error. VMEbus error occurred on an offboard post                                                                                                                                               |
| 29                       | VMEbus post timeout. VMEbus timeout on an offboard post command                                                                                                                                            |
| 2A                       | VMEbus illegal fetch address                                                                                                                                                                               |
| 2B                       | VMEbus illegal post address                                                                                                                                                                                |
| 2C                       | VMEbus scatter/gather fetch error                                                                                                                                                                          |
| 2D                       | VMEbus scatter/gather timeout                                                                                                                                                                              |
| 2E                       | Invalid scatter/gather count                                                                                                                                                                               |

| Error Code<br>Hex. value | Error description<br>SCSI errors                                                                                                         |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 30                       | SCSI selection timeout error. This error may occur due to an incorrect target ID                                                         |
| 31                       | SCSI disconnect timeout error. A disconnected device has not reselected the MVME328 in the timeout period                                |
| 32                       | Abnormal SCSI sequence. The SCSI operation did not complete successfully due to a hardware error or an abnormal operation sequence       |
| 33                       | SCSI disconnect error usually indicates that a device has disconnected without issuing either the disconnect or command complete message |
| 34                       | SCSI transfer count exception indicates that the SCSI transfer count of data did not match the count specified in the count length field |
| 35                       | SCSI parity error occurred during the information transfer phase                                                                         |

| Error Code<br>Hex. value | Error description<br>Scatter/gather errors                              |
|--------------------------|-------------------------------------------------------------------------|
| 40                       | Illegal scatter/gather count. Odd byte count in the scatter/gather list |
| 41                       | Illegal scatter/gather memory type                                      |
| 42                       | Illegal scatter/gather address                                          |



| Error Code<br>Hex. value | Error description<br>Error handling codes                                                    |
|--------------------------|----------------------------------------------------------------------------------------------|
| 50                       | Read/write buffer count error, buffer count is too large                                     |
| 51                       | Illegal read/write                                                                           |
| 80                       | Flush on error in progress                                                                   |
| 81                       | Flush work queue status                                                                      |
| 82                       | Missing command                                                                              |
| 83                       | Counter exhausted. The transfer counter has been exhausted, but more data is being requested |
| 84                       | Data direction error                                                                         |

| Error Code<br>Hex. value | Error description<br>Other errors |
|--------------------------|-----------------------------------|
| C0                       | Bad IOPB type                     |
| C1                       | IOPB timeout error                |

### 3.10.5.7 Error Record for MVME350

M350 Error Logged On Thu Sep 8 08:48:03 1988

|                           |                  |
|---------------------------|------------------|
| Minor Device Number       | 0x0              |
| <b>Logical Device</b>     | <b>128 (200)</b> |
| Device Address            | FFFF5000         |
| Retry Count               | 0                |
| Error Diagnosis           | Unrecovered      |
| Simultaneous Bus Activity | None             |

#### Registers at Error time

|              |             |
|--------------|-------------|
| ADDR-HI      | 0006        |
| ADDR-LO      | 7ec4        |
| AM           | 3d00        |
| IPCCR        | 0000        |
| <b>IPCSR</b> | <b>0000</b> |
| MODEL        | 0000        |
| ABTVEC       | 0000        |
| TAS          | 0000        |

|                                         |          |
|-----------------------------------------|----------|
| Physical Buffer Start Address           | 0010F400 |
| Transfer Size in Bytes                  | 8198     |
| Type of Transfer                        | Write    |
| <b>Block No. in Logical File System</b> | <b>0</b> |
| I/O Type                                | Physical |

#### Statistics on Device to date:

|                   |   |
|-------------------|---|
| R/W Operations    | 0 |
| Other Operations  | 2 |
| Unrecorded Errors | 0 |

### Logical Device

The Logical Device is the so-called minor number. The decoding of this field is controller dependent.

For the MVME350, it is used by the driver to select a specific action, like rewind, append or retension.

The value between brackets is the octal representation of this field, while the other value gives the decimal representation.

The decimal value, can be found in the /dev directory. (See also chapter 3, Relation CRTL. LUN, DEV. LUN).

The octal number is used for decoding, according to the following rule:

| BIT | SET               | RESET                                       |
|-----|-------------------|---------------------------------------------|
| 0   | no rewind         | rewind to begin of tape on end of operation |
| 1   | append            | truncate                                    |
| 2   | controller 1      | controller 0                                |
| 7   | without retension | with retension before operation             |

**Rewind** Before the read/write operation the tape is rewound to begin of tape.

**Append** The read/write-operation will be executed from the position of the heads on the tape. After the operation, the tape will NOT be rewound to begin of tape. Also, the tape is NOT logically closed with a double filemark.

**Truncate** The read/write-operation will be executed from the position of the heads on the tape. After the operation, the tape will be rewound to begin of tape. The tape is logically closed with a double filemark.

**Retension** Before the read/write operation the tape is retensioned.

## Registers at Error Time

- **IPCSR** is the IPC Status Register.

The meaning of the status bits is as follows:

Bit 00 through 18 are the device dependent status bits.

Bit 20 through 31 are the controller dependent bits.

The bit-meaning of this Register is:

| BIT  | MEANING                                                                                                         |
|------|-----------------------------------------------------------------------------------------------------------------|
| 31   | Error. An error occurred during this operation. The operation may have completed successfully after retries.    |
| 30   | Fatal error                                                                                                     |
| 29   | CPU abort. This operation has been aborted at the request of the CPU.                                           |
| 28   | Early termination                                                                                               |
| 27   | IPC abort. This operation has been aborted by IPC firmware.                                                     |
| 26   | Bad command                                                                                                     |
| 25   | Bad device                                                                                                      |
| 24   | Bad unit                                                                                                        |
| 23   | Timeout                                                                                                         |
| 22   | System to IPC. An error occurred in the portion of the command/data path between the CPU and the IPC.           |
| 21   | IPC to Controller. As previous, but now between the IPC and the controller chip.                                |
| 20   | Controller to device. As previous, but now between the controller chip and the phys. device.                    |
| 19   | Reserved                                                                                                        |
| 18   | Tape reset did not occur                                                                                        |
| 17   | Not at beginning of tape.                                                                                       |
| 16   | No filemark encountered. Filemark expected, but not found.                                                      |
| 15   | Exception occurred in byte 1: one or more of status bits 14-8 have been set.                                    |
| 14   | Illegal command                                                                                                 |
| 13   | No data detected                                                                                                |
| 12   | Eight or more retries. Set on a soft data error.                                                                |
| 11   | Beginning of media. Tape is positioned at beginning of tape, track 0.                                           |
| 9/10 | reserved                                                                                                        |
| 8    | Reset/powerup occurred                                                                                          |
| 7    | Exception occurred in byte 0: one or more of status bits 6-0 have been set.                                     |
| 6    | Cartridge is not in place                                                                                       |
| 5    | Drive not online. The drive is not physically connected to host or is not receiving power.                      |
| 4    | Write protected                                                                                                 |
| 3    | End of Media. The early warning hole on the last track was detected during a write operation                    |
| 2    | Unrecoverable data error. After 16 attempts the block being read or written can not be recovered.               |
| 1    | An unrecoverable data error occurred and the device can not confirm that the last block transmitted was the BIE |
| 0    | Filemark detected during Read or Read-Filemark                                                                  |

The problem with this field in the Error Record is that the corresponding register is always reset before it is logged in into the error file, so it is always 0000



### 3.10.5.8 Error Record for MVME355

M355 Error Logged On Fri Sep 16 19:54:16 1988

|                           |                |
|---------------------------|----------------|
| Minor Device Number       | 0x0            |
| <b>Logical Device</b>     | <b>15 (17)</b> |
| Device Address            | 000460A6       |
| Retry Count               | 0              |
| Error Diagnosis           | Unrecovered    |
| Simultaneous Bus Activity | None           |

Registers at Error time

|                |             |
|----------------|-------------|
| <b>command</b> | <b>0081</b> |
| <b>status</b>  | <b>0023</b> |

|                                  |          |
|----------------------------------|----------|
| Physical Buffer Start Address    | 0009A0EC |
| Transfer Size in Bytes           | 512      |
| Type of Transfer                 | Read     |
| Block No. in Logical File System | 0        |
| I/O Type                         | Physical |

Statistics on Device to date:

|                   |   |
|-------------------|---|
| R/W Operations    | 1 |
| Other Operations  | 0 |
| Unrecorded Errors | 0 |

#### Logical Device

The Logical Device is the so-called minor number. The decoding of this field is controller dependent.

The MVME355-driver uses the minor number to select a specific action, like rewind, byte swap or rewind.

The value between brackets is the octal representation of this field, while the other value gives the decimal representation.

The decimal value, can be found in the /dev directory. (See also chapter 3, Relation CRTL. LUN, DEV. LUN).

The octal number is used for decoding, according to the following rule:

| BIT | SET               | RESET                                          |
|-----|-------------------|------------------------------------------------|
| 0   | rewind            | no rewind to begin of tape on end of operation |
| 1   | Swap bytes        | Do not swap bytes                              |
| 2   | High density      | Low density                                    |
| 3   | High speed        | Low speed                                      |
| 4-6 | Drive select(0-7) | Drive select(0-7)                              |

## **Registers at Error Time**

- **Command** gives the command options (high byte) and command (lower byte).

### **Command code options:**

|      |                         |
|------|-------------------------|
| 0x80 | Read threshold enable   |
| 0x40 | Defer enable            |
| 0x20 | Reserved - must be 0    |
| 0x10 | Error detection disable |
| 0x08 | Interrupt enable        |
| 0x04 | Tape unit number bit 2  |
| 0x02 | Tape unit number bit 1  |
| 0x01 | Tape unit number bit 0  |

### **Command register:**

|      |                                |
|------|--------------------------------|
| 0x70 | Diagnostic                     |
| 0x76 | Report extended drive status   |
| 0x77 | Report configuration           |
| 0x78 | Write data buffer              |
| 0x79 | Read data buffer               |
| 0x7A | Issue optional tape command    |
| 0x7B | Read optional tape status      |
| 0x81 | Read n block(s) forward        |
| 0x82 | Write n block(s)               |
| 0x83 | Verify n block(s) forward      |
| 0x84 | Write n filemarks              |
| 0x85 | Edit write                     |
| 0x86 | Handshake                      |
| 0x87 | Initialize                     |
| 0x89 | Rewind (to load point)         |
| 0x8A | Rewind quick                   |
| 0x8B | Write n blocks and N filemarks |
| 0x8D | Move forward n blocks          |
| 0x8E | Move backward n blocks         |
| 0x91 | Move forward n filemarks       |
| 0x92 | Move backward in filemarks     |
| 0x93 | Move forward to eot            |
| 0x95 | Erase 3.5 inches               |
| 0x96 | Set drive offline              |
| 0x97 | Set drive online               |
| 0x9A | Reset formatter                |
| 0x9B | Fetch & execute iopb           |
| 0x9C | Erase to eot                   |
| 0x9D | Variable length erase          |
| 0x9E | Verify n block(s) reverse      |
| 0x9F | Read n block(s) reverse        |

So Command 0081 is a Read n blocks forward, No options.

- **Status** gives the Status Code (higher byte) and Error Code (lower byte).

**Status code register:**

|      |                          |
|------|--------------------------|
| 0x80 | Completed with no errors |
| 0x81 | Command in progress      |
| 0x82 | Completed with error     |
| 0x83 | Completed with exception |

**Error code register:**

|      |                                 |
|------|---------------------------------|
| 0x10 | Tape not ready                  |
| 0x14 | Invalid command code            |
| 0x15 | Illegal fetch & execute command |
| 0x17 | Illegal memory type             |
| 0x18 | Bus time out                    |
| 0x1A | Tape write protected            |
| 0x20 | End of tape                     |
| 0x21 | Load point error                |
| 0x23 | Uncorrectable error             |
| 0x25 | Record longer than specified    |
| 0x26 | Recorded shorter than specified |
| 0x42 | Signal definition error         |
| 0x52 | VME bus error                   |
| 0x58 | FIFO error                      |
| 0x5A | Invalid address modifiers       |
| 0x5B | Invalid memory address          |
| 0x5C | Invalid interrupt level         |
| 0x5D | Invalid dma burst count         |
| 0x60 | lop failed                      |
| 0x61 | DMA failed                      |
| 0x62 | Invalid UIB parameter           |
| 0x63 | Tape timeout                    |
| 0x64 | Invalid IOPB parameter          |
| 0x65 | Invalid record size             |
| 0x66 | Invalid transfer size           |
| 0x67 | Invalid transfer size           |
| 0x68 | Unexpected filemark             |
| 0x69 | Error in close coupling         |
| 0x70 | Time out on rewind              |
| 0x71 | Rewind not accepted             |
| 0x80 | Command aborted                 |
| 0xFF | Command not implemented         |

So Status 0023 is No status code, Error is Uncorrectable error.

### 3.10.5.9 Error Record for Stray Interrupt

Also a stray interrupt is a error condition to UNIX, giving an error record in the error file. A stray interrupt is generated when an interrupt cycle does not complete succesfully. This may happen if the interrupt request level and the interrupt acknowledge level of a controller differ. For some boards this may be caused by incorrect strapping.

If a stray interrupt occurs, there will be no error record:

Due to an error in UNIX, the system will hang.

So, if a stray interrupt occurs, check strapping of all controllers.

### 3.10.5.10 Error Record for Memory Parity Error

A memory parity error indicates that on one of the memory chips an error occurred:

MEMORY PARITY ERROR: Single-Bit Error (Corrected) at Fri Jul 15 01:09:46 1988

|                            |          |
|----------------------------|----------|
| Memory Board CSR Address   | FFFFFFE0 |
| Memory Board Syndrome Bits | 801A     |

This error is just a warning: the error was single-bit, and was corrected.

The CSR Address identifies the erroneous board.

If the error record says the error is not corrected, the corresponding board must be replaced.



### 3.11 Floppy Disk Templates, Device Names and Specifications

Under R3V6, the MVME147 driver supports a number of new floppy media. A list of supported floppy media, the associated template names and names in /dev is given in the next table:

| Floppy type           | Cyl | S/T | B/T | Size in<br>512byte<br>blocks | Template    | Name in<br>/dev/(r)dsk | Name in<br>/dev | S/FD...             |
|-----------------------|-----|-----|-----|------------------------------|-------------|------------------------|-----------------|---------------------|
| DD Motorola<br>format | 80  | 16  | 256 | slice 0 1264                 | m147dsdd5   | m147__60s0<br>(d60s0)  | f0m0            | S/FD16              |
|                       |     |     |     | slice 7 1276                 |             | m147__60s7<br>(d60s7)  | f0m7            | S/FD16              |
| DD Motorola<br>format | 80  | 16  | 256 | slice 0 1264                 | m320dsdd5   | m320__d2s0<br>(d3s0)   | 02s0 (03s0)     | S/FD16              |
|                       |     |     |     | slice 7 1276                 |             | m320__d2s7<br>(d3s7)   | 02s7 (03s7)     | S/FD16              |
| DD Motorola<br>format | 80  | 16  | 256 | slice 0 1264                 | m327dsdd5   | m327__d70s0<br>(d80s0) | -               | S/FD16              |
|                       |     |     |     | slice 7 1276                 |             | m327__d70s7<br>(d80s7) | -               | S/FD16              |
| SD PC/XT 8<br>sect/tr | 40  | 8   | 512 | slice 7 640                  | m147pcxt8   | m147__60s12            | 0pcxt8          | S/FD10/20<br>S/FD41 |
| SD PC/XT 9<br>sect/tr | 40  | 9   | 512 | slice 7 720                  | m147pcxt9   | m147__60s9             | f0pcxt9         | S/FD10/20<br>S/FD41 |
| DD PC/XT 9<br>sect/tr | 80  | 9   | 512 | slice 7 1440                 | m147pcxt9-3 | m147__60s13            | f0pcxt9__3      | S/FD41              |
| DD PC/AT              | 80  | 15  | 512 | slice 0 2370                 | m147pcat    | m147__60s3<br>(s60s0)  | f0pcat0         | S/FD19<br>S/FD42    |
|                       |     |     |     | slice 7 2400                 |             | m147__60s8<br>(s60s7)  | f0pcat7         |                     |
| DD PC/AT              | 80  | 15  | 512 | slice 0 2370                 | m320pcat    | m320__s2s0<br>(s3s0)   | -               | S/FD19              |
|                       |     |     |     | slice 7 2400                 |             | m320__s2s7<br>(s3s7)   | -               |                     |
| DD PC/AT              | 80  | 15  | 512 | slice 0 2370                 | m327pcat    | m327__s70s0<br>(d80s0) |                 | S/FD19              |
|                       |     |     |     | slice 7 2400                 |             | m327__s70s7<br>(d80s7) |                 |                     |
| DD PS/2               | 80  | 18  | 512 | slice 7 2880                 | m147ps2     | m147__60s10            | f0ps2           | S/FD42              |
| HD, TEAC<br>only      | 80  | 36  | 512 | slice 7 5760                 | m147shd     | m147__60s11            | f0shd           | ?                   |

## 3.12 HANDLING NEW DISK ERRORS

New Disk Errors are rare but do occasionally occur and therefore we need to define a procedure to recover from this situation. The bad spots are reported via an error message on the console and also via the error report logging mechanism.

**NOTE:** *Also SCSI disks can give a problem with bad spots. If there are more bad sectors/track than specified in the disk template, sector slipping is not possible anymore. The whole track must be redirected in the same way as for the other disks, although the disk is specified as perfect.*

*The disk templates in systems with SCSI disks formatted with R3V4/FE83.15 or R3V5/FE83.27 must be altered if a track must be redirected. The entry ALTERNATE LIST is 0 and must be changed into 1-1 (in case seagate 80Mb disk in 1-3).*

*This problem is solved in R3V5.1 (upgrade FU83.08).*

### 3.12.1 Dynamic Bad Track Redirection

To perform dynamic bad track redirection you must be in Single User Mode.

**NOTE:** *If the errors are in the swap area (or the root file system, this may change in future releases) you must boot off another disk or tape device and correct the errors from there.*

Mount the necessary file systems.

Before starting the redirect action, backup the complete disk.

#### Identify new bad spots

Disk errors may be detected whilst running diagnostics or by running a surface read test. In both cases the bad tracks will be reported in Head/Cylinder format.

Errors detected whilst the system is running can be found in the following way:

Run **errpt -a|pg**

For an example, see below. In this example an MVME328 is in use.

M328      Error Logged On Thu Nov 14 14:01:25 1991

|                           |             |
|---------------------------|-------------|
| SCSI Device Number        | 0           |
| Logical Device            | 3 (03)      |
| Device Address            | 001BB190    |
| Retry Count               | 0           |
| Error Diagnosis           | Unrecovered |
| Simultaneous Bus Activity | None        |

Registers at Error time

|         |      |
|---------|------|
| DEVICE  | 7403 |
| BOFF-HI | 0000 |
| BOFF-LO | 000c |
| CSR     | d47a |
| CMD     | 000f |
| OPTIONS | 0020 |
| SCSICMD | 0003 |
| STATUS  | 0008 |

|                                  |          |
|----------------------------------|----------|
| Physical Buffer Start Address    | 0029D800 |
| Transfer Size in Bytes           | 1024     |
| Type of Transfer                 | Read     |
| Block No. in Logical File System | 28961    |
| I/O Type                         | Buffered |

|                     |        |
|---------------------|--------|
| Block Offset of I/O | 840826 |
|---------------------|--------|

Statistics on Device to date:

|                   |       |
|-------------------|-------|
| R/W Operations    | 20559 |
| Other Operations  | 2     |
| Unrecorded Errors | 0     |

As you can see, there is an hard error detected on physical device 0, logical device 3 (slice 3), The error is unrecovered, and the defective logical block number is 28961. This is the block number inside the file system on the slice 3.

**Redirect via sysadm**

Startup **sysadm** and select the following options:

- 1 diagnostics
- 1 diskrepair
- 1 badtrack

This will result in a menu with four options

- 1 delfsckfiles
- 2 fixfsys
- 3 redirect
- 4 updbadlist

First we want to know which file is using the defect block and also which files are on the same track as the defect block is. Therefore we select the option 3 redirect. This results in a question:

Do you wish to WRITE [y, n, ?, q]

Select n (not writing). The result will be a menu which looks as follows:

Valid Devices Are:

- |                |                |               |
|----------------|----------------|---------------|
| 1. m323__0     | 11. m327__1d20 | 21. m328__100 |
| 2. m323__1     | 12. m327__1d30 | 22. m328__101 |
| 3. m323__2     | 13. m328__000  | 23. m328__102 |
| 4. m323__3     | 14. m328__001  | 24. m328__103 |
| 5. m327__00    | 15. m328__002  | 25. m328__110 |
| 6. m327__10    | 16. m328__003  | 26. m328__111 |
| 7. m327__20    | 17. m328__010  | 27. m328__112 |
| 8. m327__30    | 18. m328__011  | 28. m328__113 |
| 9. m327__1d00  | 19. m328__012  |               |
| 10. m327__1d10 | 20. m328__013  |               |

Select the correct controller and correct drive number. In this case we select 13, the first MVME328 and the first disk. The system will ask now which type of disk is in use. If you do not know this, you have to find it out.

One way to find it out is via the disk definition utility ddefs. For this you have to leave sysadm, so quite via q in that case and run:

```
/etc/ddefs -p /dev/rdisk/m328__007|pg
```

This should result in something like:

```
Disk definition for '/dev/rdisk/m328__000s7'
Disk type: 4866
Diagnostic tracks: no
Bad spot strategy: PERFECT
Number of sectors: 1195740
etc. etc.
```

Via the *Disk type* and the *Number of sectors* and the Disk Templates in chapter 18 you can find out which type of disk is in the system. In this example it is an MVME876 600Mbyte WREN V SCSI disk.

So enter the correct disk type.

Then the system will ask you:

Will the track information be from a file (default:y)?

Answer with n



This will result in the next menu on the screen, asking for the format of the bad track data, eg:

1. <HEAD> <Cylinder> <Log Sector>
2. <Log Device> <Block>

If you still do know the error message on the console you may select 1, if you do not have this error message you have to use the output of the error report mechanism. In that case you select 2.

This will result in an overview of the selections you have done. Enter a **b** to start an investigation (redirection) on the disk which will create the so-called fsck input file. Sysadm will ask then for the bad track information.

It can happen that there is present a fsck input check file, this one should be deleted. Then enter the bad track information, in this case:

3 28961

The system does make the fsck input file containing the block numbers present on the track containing the bad spot. This fsck input file will be used during the 'fixfsys' option. Return to the BADTRACK HANDLING menu and select the 'fixfsys' option. This option will report the existence of the fsck input file and asks for a selection:

Select:

- check (no repairs attempted)
- interactive repair
- automatic repair

[c, i, a, ?, q]:

Select the check option, so only checking the file system (logical disk).

The fsck input file is used by fsck to find out which files are effected by this redirect action. Note these file(s).

You may have a try to backup these files, one file can give problems because of the bad spot. After the real redirection the information on the track is gone.

After this you may return to the BAD TRACK HANDLING menu and select option 3 redirect again.

Answer to the question:

Do you wish to WRITE      **y**    (The y from, yes please)

After this the track with the bad spot is redirected.

### 3.13 RELATIONS CTRL. LUN, DEV. LUN

#### 3.13.1 Disk controllers

| Disk controller<br>MVME | Entry in<br>/dev | Entry in<br>/dev/[r]disk | Dev.<br>LUN | Major Nr |                   | Minor Nr | REMARKS                           |
|-------------------------|------------------|--------------------------|-------------|----------|-------------------|----------|-----------------------------------|
|                         |                  |                          |             | Block    | Char<br>or<br>Raw |          |                                   |
| 320A/B (1st)            | [r]00[snr]       | m320 0snr                | 0           | 2        | 21                | 0 ÷ 7    | First fixed disk, slice 0 thru 7  |
|                         | [r]01[snr]       | m320 1snr                | 1           | 2        | 21                | 8 ÷ 15   | Second fixed disk, slice 0 thru 7 |
|                         | [r]02[s7]        | m320 2s7                 | 2           | 2        | 21                | 23       | 638kb floppy, slice 7             |
|                         | FLOPPY           | m320 2s7                 | 2           | 2        | 21                | 23       | 638kb floppy, slice 7             |
|                         | [r]02s0          | m320 2s0                 | 2           | 2        | 21                | 16       | 632kb floppy, slice 0             |
|                         | 02s7             | m320 2s7                 | 2           | 2        | 21                | 23       | 638kb floppy, slice 7             |
|                         | MFLOPPY          | m320 2s7                 | 2           | 2        | 21                | 23       | 638kb floppy, slice 7             |
|                         |                  | m320 s2s7                | 2           | 2        | 21                | 20       | 1.2Mb floppy, slice 7             |
|                         |                  | m320 s2s0                | 2           | 2        | 21                | 19       | 1.2Mb floppy, slice 0             |
|                         |                  |                          |             |          |                   |          |                                   |
| 320A/B (2nd)            | [r]10[snr]       | m320 1d0snr              | 0           | 2        | 21                | 64 ÷ 71  | First fixed disk, slice 0 thru 7  |
|                         | [r]11[snr]       | m320 1d1snr              | 1           | 2        | 21                | 72 ÷ 79  | Second fixed disk, slice 0 thru 7 |
| 323                     | [r]80[snr]       | m323 0snr                | 0           | 7        | 26                | 0 ÷ 7    | First fixed disk, slice 0 thru 7  |
|                         | [r]81[snr]       | m323 1snr                | 1           | 7        | 26                | 16 ÷ 23  | Second fixed disk, slice 0 thru 7 |
|                         | [r]82[snr]       | m323 2snr                | 2           | 7        | 26                | 32 ÷ 39  | Third fixed disk, slice 0 thru 7  |
|                         | [r]83[snr]       | m323 3snr                | 3           | 7        | 26                | 48 ÷ 55  | Fourth fixed disk, slice 0 thru 7 |

NOTES: [ ] Optional argument  
[r] The 'r' stands for raw device  
snr Indicates the slice number

### 3.13.2 Tape controllers

| Tape controller<br>MVME      | Entry in<br>/dev    | Entry in<br>/dev/[r]mt | Dev.<br>LUN | Major Nr |                   | Minor<br>Nr | REMARKS                    |
|------------------------------|---------------------|------------------------|-------------|----------|-------------------|-------------|----------------------------|
|                              |                     |                        |             | Block    | Char<br>or<br>Raw |             |                            |
| Generic Tape<br>Driver nr. 1 | [r]40[a, an, t, tn] |                        | 0           | 108      | 108               | 0 ÷ 7       | First generic tape driver  |
|                              | TAPE.CART           |                        | 0           | 108      | 108               | 0           | Same as /dev/r40           |
|                              | [r]41[a, an, t, tn] |                        | 0           | 108      | 108               | 0 ÷ 7       | Second generic tape driver |
| Generic Tape<br>Driver nr. 2 | [r]50[a, an, t, tn] |                        | 0           | 109      | 109               | 0 ÷ 7       | First generic tape driver  |
|                              | [r]51[a, an, t, tn] |                        | 0           | 109      | 109               | 0 ÷ 7       | Second generic tape driver |
| 350 (1st)                    |                     | m350__0[a, n, t]       | 0           | 3        | 22                | 0 ÷ 3       | See notes                  |
| 350 (2nd)                    |                     | m350__0[a, n, t]       | 0           | 3        | 22                | 4 ÷ 7       | See notes                  |
| 355                          | r60[b, h, n, s]     | m355__0[b, h, n, s]    | 0           |          | 109               | 0 ÷ 15      | See notes                  |
|                              | TAPE.9TRK           |                        | 0           |          | 16                | 1           | Same as /dev/r60           |

NOTES: [ ] Optional argument  
[r] The 'r' stands for raw device  
For the Generic Tape and MVME350:  
a stands for append  
an stands for append, no rewind  
t stands for truncate  
tn stands for truncate, no rewind

For the MVME355:  
b stands for byte swap  
h stands for high density  
n stands for no rewind  
s stands for high speed

### 3.13.3 SCSI controllers

| SCSI cont.<br>MVME | Entry in<br>/dev                                                                       | Entry in<br>/dev/[r]dsk | Entry in<br>/dev/rmt                                     | Dev.<br>LUN | Major Nr |                   | Minor<br>Nr | REMARKS                |
|--------------------|----------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------|-------------|----------|-------------------|-------------|------------------------|
|                    |                                                                                        |                         |                                                          |             | Block    | Char<br>or<br>Raw |             |                        |
| 147                | [r]f0m0<br>[r]f0m7<br>[r]f0pcxt9 3<br>[r]f0pcat0<br>[r]f0pcat7<br>[r]f0ps2<br>[r]f0shd | m147 00snr              | m147 40<br>[a, n, r, t]<br>m147 50<br>[a, n, r, t]       | 0           | 96       | 96                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                    |                                                                                        | m147 10snr              |                                                          | 1           | 97       | 97                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                    |                                                                                        | m147 20snr              |                                                          | 2           | 98       | 98                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                    |                                                                                        | m147 30snr              |                                                          | 3           | 99       | 99                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                    |                                                                                        |                         |                                                          | 4           | 100      | 100               | 0 ÷ 7       | Tape, see notes        |
|                    |                                                                                        | m147 60s0               |                                                          | 5           | 101      | 101               | 0 ÷ 7       | Tape, see notes        |
|                    |                                                                                        | m147 60s7               |                                                          | 6           | 102      | 102               | 16          | 632kb floppy, slice 0  |
|                    |                                                                                        | m147 60s13              |                                                          | 6           | 102      | 102               | 23          | 638kb floppy, slice 7  |
|                    |                                                                                        | m147 60s3               |                                                          | 6           | 102      | 102               | 29          | 720kb floppy, slice 7  |
|                    |                                                                                        | m147 60s8               |                                                          | 6           | 102      | 102               | 19          | 1.2Mb floppy, slice 0  |
|                    |                                                                                        | m147 60s10              |                                                          | 6           | 102      | 102               | 24          | 1.2Mb floppy, slice 7  |
|                    |                                                                                        | m147 60s11              |                                                          | 6           | 102      | 102               | 26          | 1.44Mb floppy, slice 7 |
|                    |                                                                                        |                         |                                                          | 6           | 102      | 102               | 27          | 2.88Mb floppy, slice 7 |
|                    |                                                                                        |                         |                                                          |             |          |                   |             |                        |
| 187                | [r]f0m0<br>[r]f0m7<br>[r]f0pcxt9 3<br>[r]f0pcat0<br>[r]f0pcat7<br>[r]f0ps2<br>[r]f0shd | m187 00snr              | m187 40<br>[v, n, 0-3]d[n]<br>m187 50<br>[v, n, 0-3]d[n] | 0           | 48       | 48                | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                    |                                                                                        | m187 10snr              |                                                          | 1           | 48       | 48                | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                    |                                                                                        | m187 20snr              |                                                          | 2           | 48       | 48                | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                    |                                                                                        | m187 30snr              |                                                          | 3           | 48       | 48                | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                    |                                                                                        |                         |                                                          | 4           | 48       | 48                | 96          | Tape, see notes        |
|                    |                                                                                        | m187 60s0               |                                                          | 5           | 48       | 48                | 103         | Tape, see notes        |
|                    |                                                                                        | m187 60s7               |                                                          | 6           | 48       | 48                | 109         | 632kb floppy, slice 0  |
|                    |                                                                                        | m187 60s13              |                                                          | 6           | 48       | 48                | 99          | 638kb floppy, slice 7  |
|                    |                                                                                        | m187 60s3               |                                                          | 6           | 48       | 48                | 104         | 720kb floppy, slice 7  |
|                    |                                                                                        | m187 60s8               |                                                          | 6           | 48       | 48                | 106         | 1.2Mb floppy, slice 0  |
|                    |                                                                                        | m187 60s10              |                                                          | 6           | 48       | 48                | 07          | 1.2Mb floppy, slice 7  |
|                    |                                                                                        | m187 60s11              |                                                          | 6           | 48       | 48                |             | 1.44Mb floppy, slice 7 |
|                    |                                                                                        |                         |                                                          | 6           | 48       | 48                |             | 2.88Mb floppy, slice 7 |
|                    |                                                                                        |                         |                                                          |             |          |                   |             |                        |

NOTES: [ ] Optional argument

[r] The 'r' stands for raw device

snr Indicates the slice number

For the tape unit connected to the MVME147:

a stands for append r stands for retention

n stands for no rewind t stands for truncate

For the tape unit connected to the MVME187:

v optional for streamer, no double buffering, use variable block mode

hl speed selection for start/stop device, 'h' is high, 'l' is low speed

0-3 density selection, used as index in density select table of the device

n stands for no rewind



| SCSI<br>cont.<br>MVME | Entry in<br>/dev                                                              | Entry in<br>/dev/[r]dsk | Entry in<br>/dev/rmt                                                                                   | Dev.<br>LUN | Major Nr |                   | Minor<br>Nr | REMARKS                |
|-----------------------|-------------------------------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------|-------------|----------|-------------------|-------------|------------------------|
|                       |                                                                               |                         |                                                                                                        |             | Block    | Char<br>or<br>Raw |             |                        |
| 327A<br>(1st)         |                                                                               | m327 00snr              | m327 40<br>[a,n,r,t]<br>m327 50<br>[a,n,r,t]                                                           | 0           | 80       | 80                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 10snr              |                                                                                                        | 1           | 81       | 81                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 20snr              |                                                                                                        | 2           | 82       | 82                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 30snr              |                                                                                                        | 3           | 83       | 83                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 d70s0              |                                                                                                        | 4           | 84       | 84                |             | Tape, see notes        |
|                       |                                                                               | m327 d70s7              |                                                                                                        | 5           | 85       | 85                | 16          | Tape, see notes        |
|                       |                                                                               | m327 s70s0              |                                                                                                        |             | 87       | 87                | 23          | 632kb floppy, slice 0  |
|                       |                                                                               | m327 s70s7              |                                                                                                        |             | 87       | 87                | 19          | 638kb floppy, slice 7  |
|                       |                                                                               |                         |                                                                                                        |             | 87       | 87                | 20          | 1.2Mb floppy, slice 0  |
|                       |                                                                               |                         |                                                                                                        |             | 87       | 87                |             | 1.2Mb floppy, slice 7  |
| 327A<br>(2nd)         |                                                                               | m327 1d00snr            | m327 1d40<br>[a,n,r,t]<br>m327 1d50<br>[a,n,r,t]                                                       | 0           | 88       | 88                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 1d10snr            |                                                                                                        | 1           | 89       | 89                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 1d20snr            |                                                                                                        | 2           | 90       | 90                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 1d30snr            |                                                                                                        | 3           | 91       | 91                | 0 ÷ 7       | Disk, slice 0 thru 7   |
|                       |                                                                               | m327 1dd70s0            |                                                                                                        | 4           | 92       | 92                |             | Tape, see notes        |
|                       |                                                                               | m327 1dd70s7            |                                                                                                        | 5           | 93       | 93                |             | Tape, see notes        |
|                       |                                                                               | m327 1ds70s0            |                                                                                                        |             | 95       | 95                | 16          | 632kb floppy, slice 0  |
|                       |                                                                               | m327 1ds70s7            |                                                                                                        |             | 95       | 95                | 23          | 638kb floppy, slice 7  |
|                       |                                                                               |                         |                                                                                                        |             | 95       | 95                | 19          | 1.2Mb floppy, slice 0  |
|                       |                                                                               |                         |                                                                                                        |             | 95       | 95                | 20          | 1.2Mb floppy, slice 7  |
| 328                   | f[0-n]m0<br>f[0-n]0m7<br>f[0-n]pcat0<br>f[0-n]pcat7<br>f[0-n]ps2<br>f[0-n]shd | m328 CBA <sub>snr</sub> | m328 CBA <sub>vn</sub><br>m328 CBA <sub>vn</sub><br>m328 CBA<br>[ht][0-3]dn<br>m328 CBA<br>[ht][0-3]dn | 0           |          |                   | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                       |                                                                               | m328 CBA <sub>snr</sub> |                                                                                                        | 1           |          |                   | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                       |                                                                               | m328 CBA <sub>snr</sub> |                                                                                                        | 2           |          |                   | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                       |                                                                               | m328 CBA <sub>snr</sub> |                                                                                                        | 3           |          |                   | 0 ÷ 15      | Disk, slice 0 thru 15  |
|                       |                                                                               |                         |                                                                                                        | 4           |          |                   |             | Tape, see notes        |
|                       |                                                                               |                         |                                                                                                        | 5           |          |                   |             | Tape, see notes        |
|                       |                                                                               |                         |                                                                                                        | 4           |          |                   |             | Tape, see notes        |
|                       |                                                                               |                         |                                                                                                        | 5           |          |                   |             | Tape, see notes        |
|                       |                                                                               |                         |                                                                                                        | 6           |          |                   |             | 632kb floppy, slice 0  |
|                       |                                                                               |                         |                                                                                                        | 6           |          |                   |             | 638kb floppy, slice 7  |
|                       |                                                                               |                         |                                                                                                        | 6           |          |                   |             | 1.2Mb floppy, slice 0  |
|                       |                                                                               |                         |                                                                                                        | 6           |          |                   |             | 1.2Mb floppy, slice 7  |
|                       |                                                                               |                         |                                                                                                        | 6           |          |                   |             | 1.44Mb floppy, slice 7 |
|                       |                                                                               |                         |                                                                                                        | 6           |          |                   |             | 2.88Mb floppy, slice 7 |

NOTES: [ ] Optional argument  
[r] The 'r' stands for raw device  
snr Indicates the slice number

For the streamer tape units:  
a;n;r;t;v see previous page

For the start/stop tape units:  
hl;0-3;n see previous page

For the MVME328:

The major nr (block and char) of  
the first one is 116, than 117 and so on.  
Maximal 6 MVME328 boards allowed.

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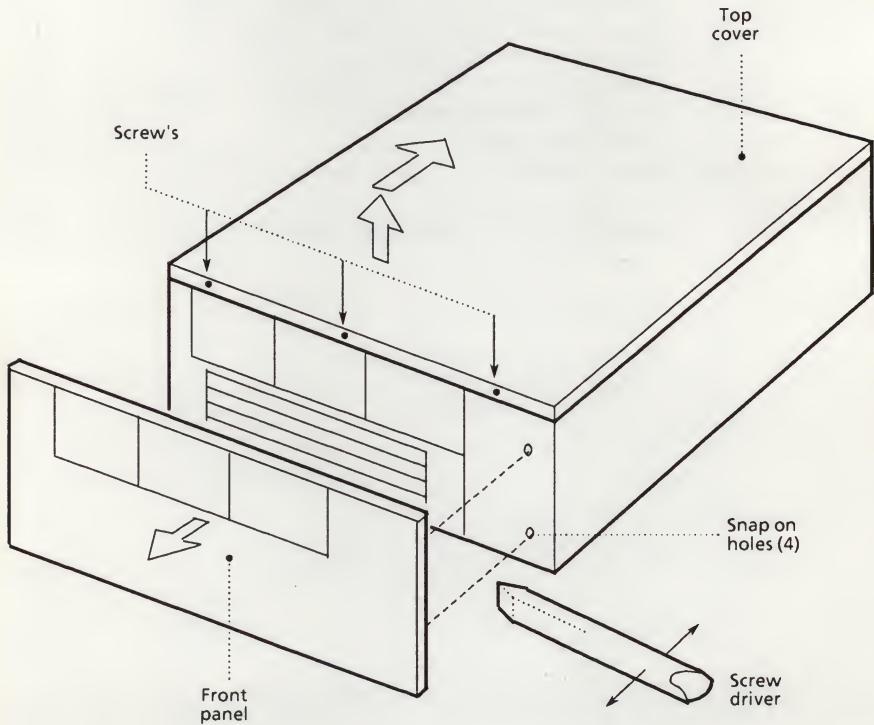
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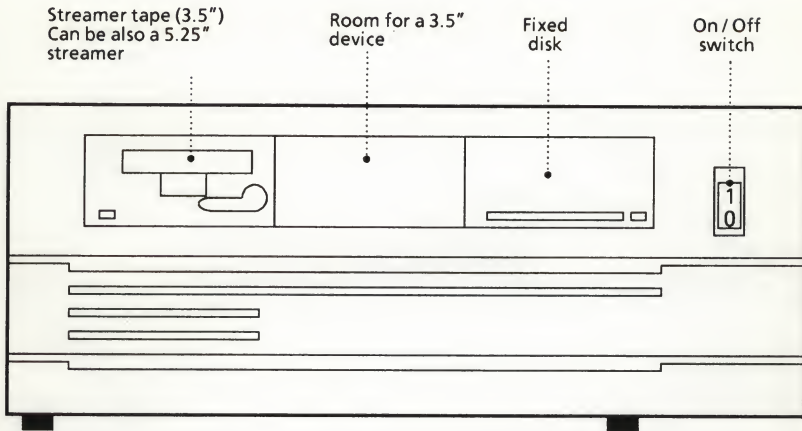
### 4.1.1 Locators

#### 4.1.1.1 Locator P9030/P9035 (Removing System Enclosure)

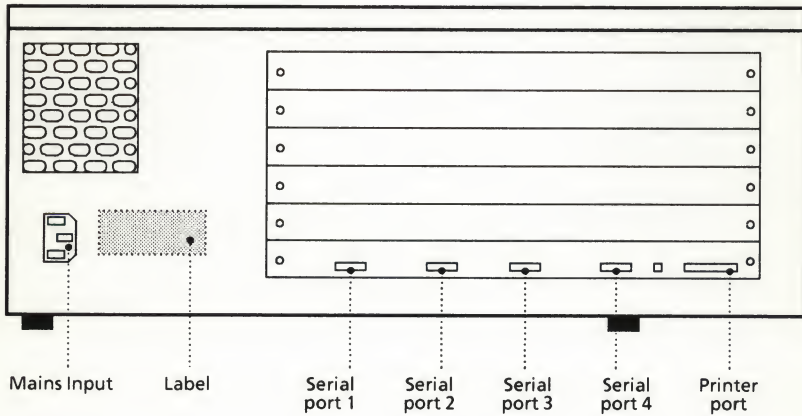


Front View with "Snap-On" Front Panel Removed.

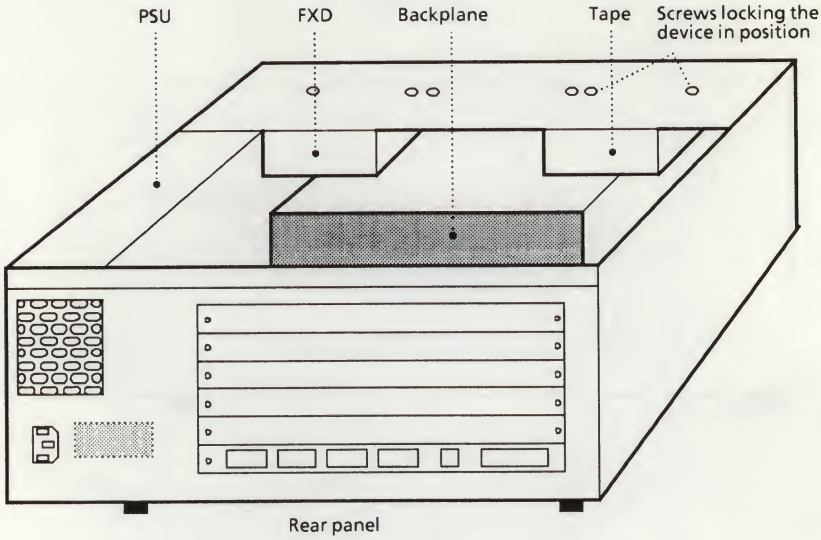
#### 4.1.1.2 Locator P9030/P9035 (Front Panel )



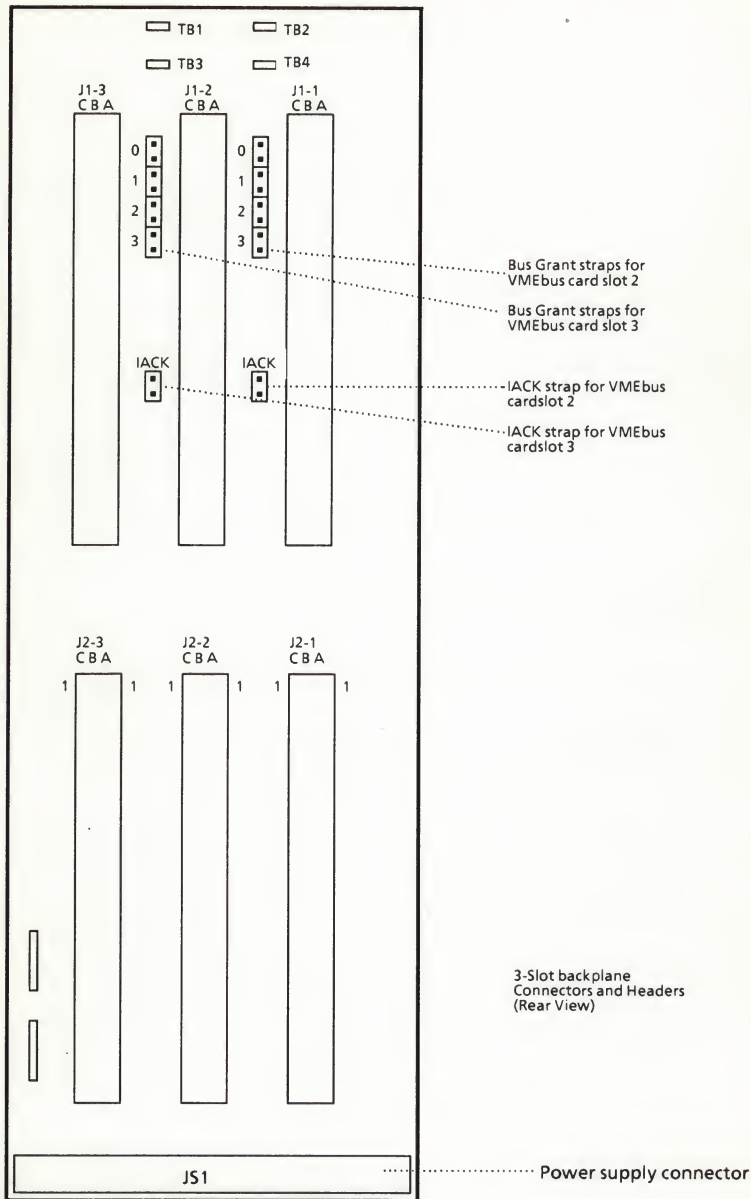
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P9030/P9035 Rear Panel



# 4.1.1.4 Locator P9030/P9035 Backplane (Connector Configuration)





#### 4.1.1.5 MVME Module Locator P9030/P9035 Card Cage

|     | SLOT            | 1   | 2   | 3   |
|-----|-----------------|-----|-----|-----|
| Seq | Module          |     |     |     |
| 1   | MVME147/MVME187 | 1st | /   | /   |
| 2   | 1st MVME332XT   | /   | 1st | 2nd |
| 3   | 2nd MVME332XT   | /   | /   | 1st |
| 4   | MVME374         | /   | 1st | 2nd |
| 5   | MVME376         | /   | 1st | 2nd |
| 6   | 1st MVME333     | /   | 1st | 2nd |
| 7   | 2nd MVME333     | /   | /   | 1st |
| 8   | MVME333X25      | /   | 1st | 2nd |
| 9   | MVME335         | /   | 1st | 2nd |
| 10  | MVME336         | /   | 1st | 2nd |
| 11  | MVME338         | /   | 1st | 2nd |

**NOTE:** Slot 1 is the bottom slot.

#### 4.1.1.6 Transition Module Locator P9030/P9035

|     | SLOT              | 6   | 5   | 4   | 3   | 2   | 1   |
|-----|-------------------|-----|-----|-----|-----|-----|-----|
| Seq | Module            |     |     |     |     |     |     |
| 1   | MVME712A/1x7      | /   | /   | /   | /   | /   | 1st |
| 2   | MVME712B/1x7      | /   | /   | /   | /   | 1st | /   |
| 3   | MVME712C/1x7      | /   | /   | /   | /   | 1st | /   |
| 4   | MVME710P/332XT    | /   | /   | /   | 2nd | 1st | /   |
| 5   | 1st MVME710/332XT | /   | 2nd | 2nd | 1st | 1st | /   |
| 6   | 2nd MVME710/332XT | /   | 1st | 1st | /   | /   | /   |
| 7   | MVMELAN/374       | 5th | 4th | 3rd | 2nd | 1st | /   |
| 7   | MVMELAN/376       | 5th | 4th | 3rd | 2nd | 1st | /   |
| 8   | 1st MVME705A/333  | /   | 2nd | 2nd | 1st | 1st | /   |
| 9   | 2nd MVME705A/333  | /   | 1st | 1st | /   | /   | /   |
| 10  | 1st MVME705B/333  | 5th | 4th | 3rd | 2nd | 1st | /   |
| 11  | 2nd MVME705B/333  | 4th | 3rd | 2nd | 1st | /   | /   |
| 12  | MVME715P/335      | 5th | 4th | 3rd | 2nd | 1st | /   |
| 13  | MVME751/336       | /   | 2nd | 2nd | 1st | 1st | /   |

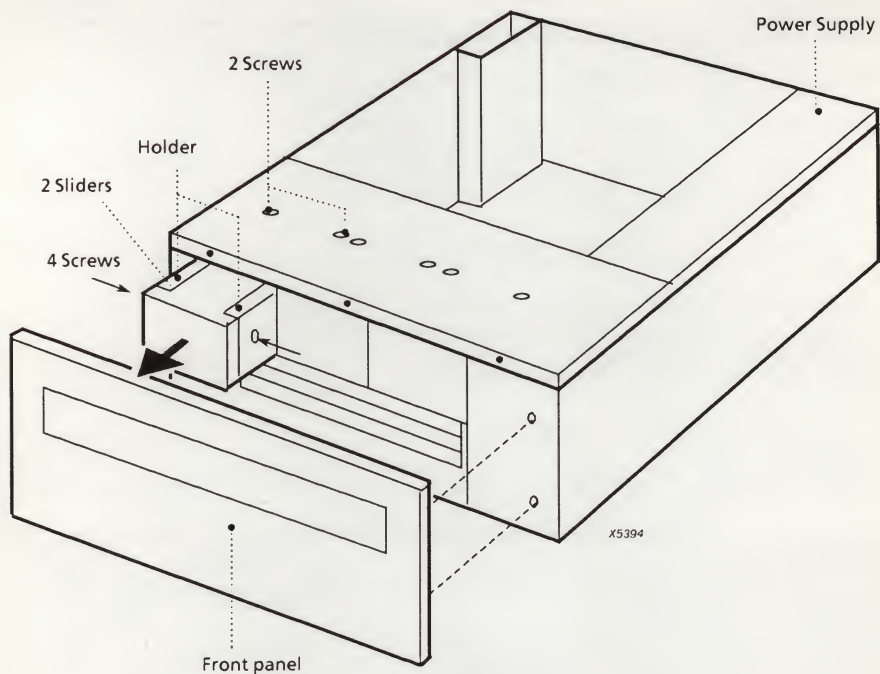
#### 4.1.1.7 Number of System Components, Disk and Tape Drives

| Module Name | Description                               | VME Slots Used | Maximum In System |
|-------------|-------------------------------------------|----------------|-------------------|
| MVME147RF   | 68030 16MHz Processor with 4Mb DRAM       | 1              | 1                 |
| MVME147-1   | 68030 25MHz Processor with 4Mb DRAM       | 1              | 1                 |
| MVME147S-1  | 68030 25MHz Processor with 4 Mb DRAM      | 1              | 1                 |
| MVME147SA-1 | 68030 25MHz Processor with 8Mb DRAM       | 1              | 1                 |
| MVME147SB-1 | 68030 25MHz Processor with 16Mb DRAM      | 1              | 1                 |
| MVME147SC-1 | 68030 25MHz Processor with 32Mb DRAM      | 1              | 1                 |
| MVME187B    | 88100 25MHz Processor with 16Mb DRAM      | 1              | 1                 |
| MVME187C    | 88100 25MHz Processor with 32Mb DRAM      | 1              | 1                 |
| MVME332XT   | 8-port Serial Parallel Controller         | 1              | 2                 |
| MVME333     | Intelligent WAN Controller for SNA or BSC | 1              | 2                 |
| MVME333X25  | X.25 Controller                           | 1              | 1                 |
| MVME335     | Serial and Parallel I/O Module            | 1              | 1                 |
| MVME336     | DeltaLink Controller                      | 1              | 1                 |
| MVME338     | Terminal I/O Subsystem                    | 1              | 1                 |
| MVME374     | Ethernet LAN Controller                   | 1              | 1                 |
| MVME376     | High Perf. Ethernet LAN Controller        | 1              | 1                 |

| Module Name    | Description                       | Associated Module | Back Panel Slots |
|----------------|-----------------------------------|-------------------|------------------|
| MVME332PA2     | Dual Parallel Port                | MVME332XT         | 1                |
| MVME705A       | 6-Port Serial Transition Board    | MVME333           | 2                |
| MVME705B       | 3-Port Serial Transition Board    | MVME333 X25       | 1                |
| MVME710        | Serial Port Transition Board      | MVME332XT         | 2                |
| MVME712A or AM | Serial 4-Port Transition Board    | MVME1x7           | 1                |
| MVME712B       | Ethernet SCSI Adapter             | MVME1x7           | 1                |
| MVME712C       | Thinnet SCSI adapter              | MVME1x7           | 1                |
| MVME715P       | 4-Port Serial Transition Board    | MVME335           | 2                |
| MVME719        | Thinnet transceiver               | MVME374           | 2                |
| MVME732        | Remote Service Modem on MVME712AM | MVME712AM         | 1                |
| MVME751        | Serial Port Transition Board      | MVME336           | 2                |
| MVMELAN        | Transition board                  | MVME374           | 1                |

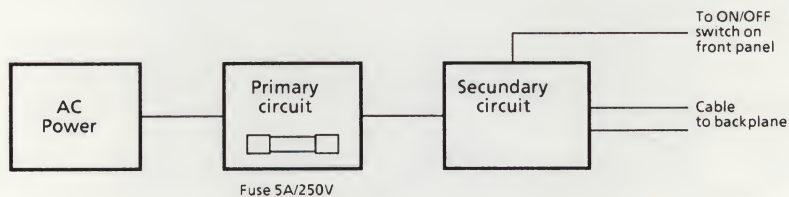
| Module Name | Description                                 | Peripheral Slots Used | Maximum In System |
|-------------|---------------------------------------------|-----------------------|-------------------|
| MVME853     | 150Mb SCSI Streaming Tape Drive (5½ inch.)  | 1 half-height         | 1                 |
| MVME854     | 525Mb SCSI Streaming Tape Drive (5½ inch.)  | 1 half-height         | 1                 |
| MVME855     | 155Mb SCSI Streaming Tape Drive (3½ inch.)  | 1 half-height         | 1                 |
| MVME862     | 48Mb SCSI Winchester Disk Drive (3½ inch.)  | 1 half-height         | 2                 |
| MVME863     | 104Mb SCSI Winchester Disk Drive (3½ inch.) | 1 half-height         | 2                 |
| MVME864     | 172Mb SCSI Winchester Disk Drive (3½ inch.) | 1 half-height         | 2                 |
| MVME865     | 330Mb SCSI Winchester Disk Drive (3½ inch.) | 1 half-height         | 1                 |
| MVME866     | 520Mb SCSI Winchester Disk Drive (3½ inch.) | 1 half-height         | 1                 |
| MVME884     | 1-4Mb SCSI Diskette Drive (3½ inch.)        | 1 half-height         | 1                 |

#### 4.1.1.9 Mounting Disk and Tape Drives



**NOTE:** Loosen the two screws at the top, pull the drive forwards and remove the two sliders.

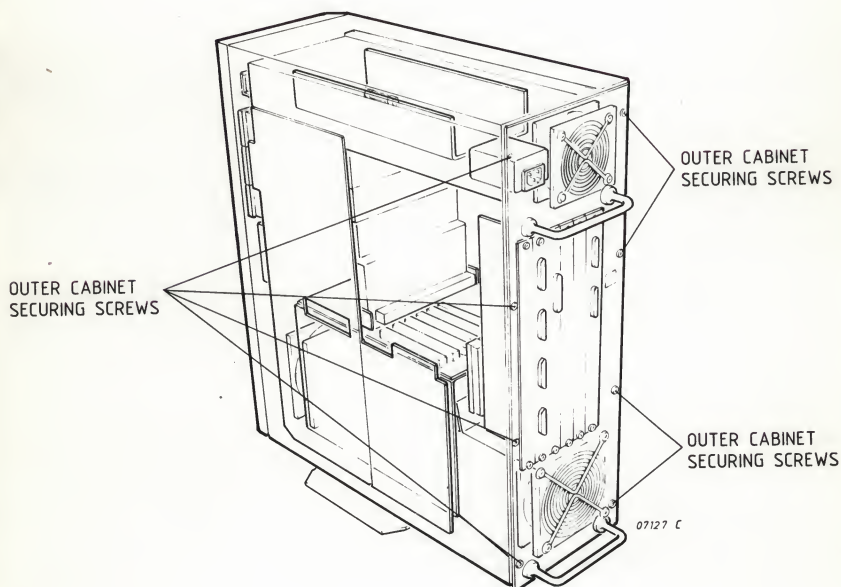
#### 4.1.2 Power Distribution



## 4.2 P9050 (old cabinet)

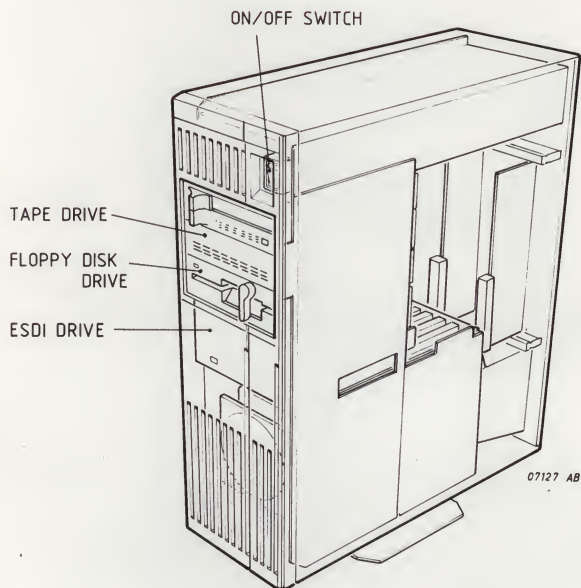
### 4.2.1 Locators

#### 4.2.1.1 Locators P9050 (Removing System Enclosure)

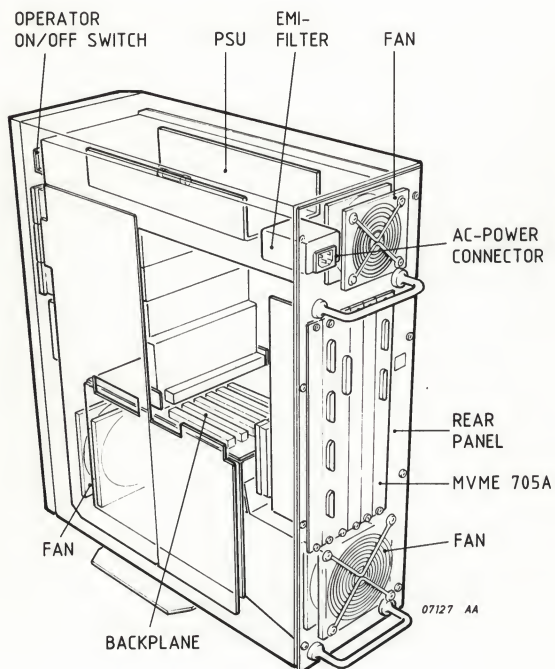




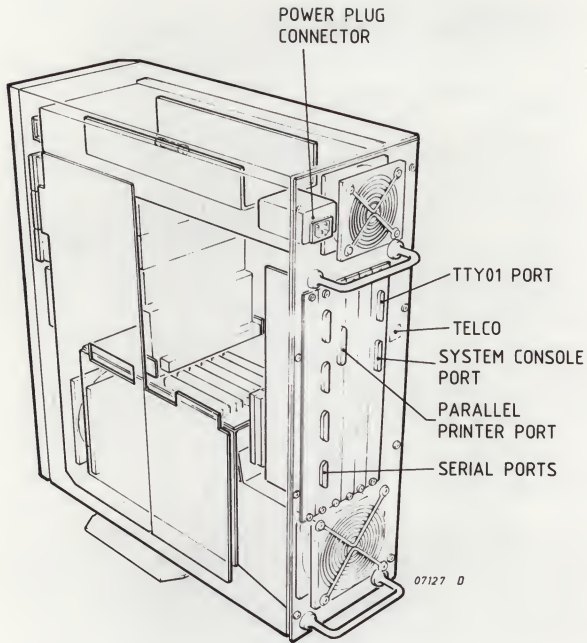
#### 4.2.1.2 Locators P9050 (Front Panel)



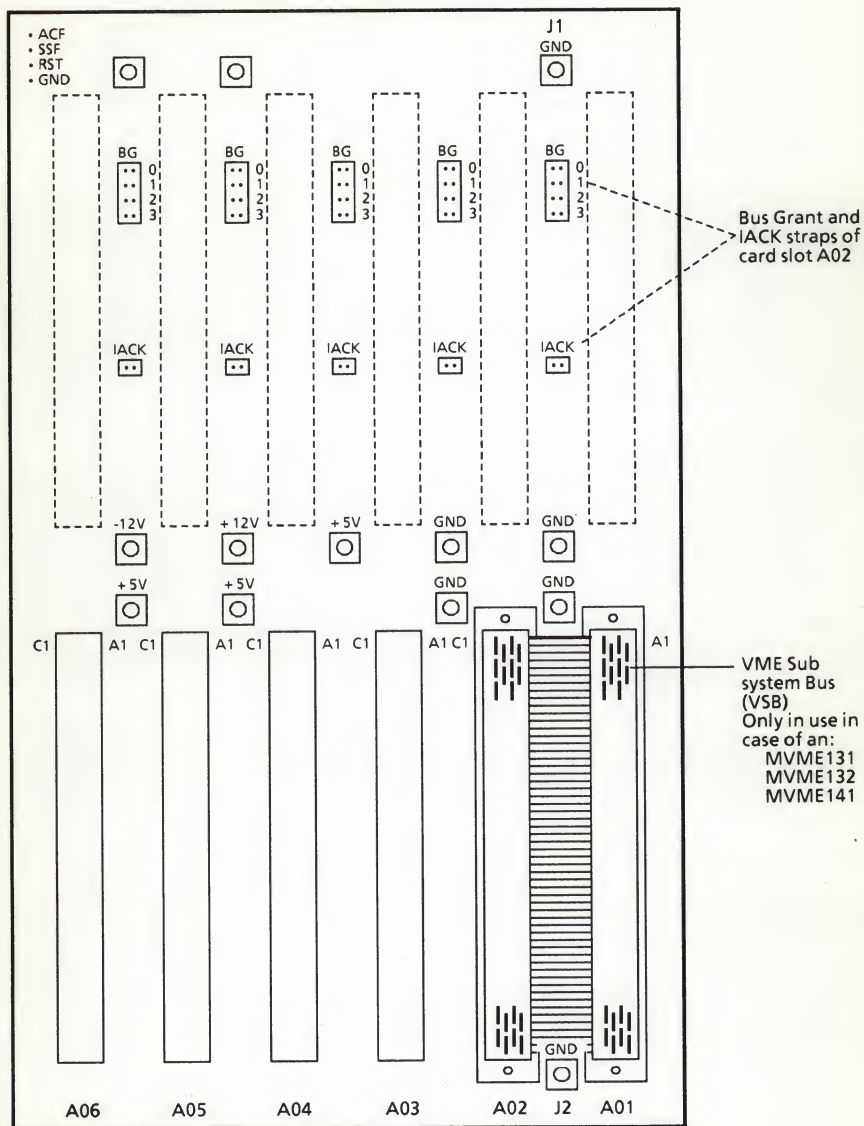
### 4.2.1.3 Locators P9050 (Backplane and Front Panel)



## P9050 Rear Panel



#### 4.2.1.4 Backplane P9050 (Old cabinet)





#### 4.2.1.5 Locators P9050-002 and 003 Backplane

|   | SLOT           | 1   | 2 | 3   | 4   | 5   | 6   |
|---|----------------|-----|---|-----|-----|-----|-----|
| 1 | MVME134F-3     | 1st | / | /   | /   | /   | /   |
| 2 | MVME320B       | /   | / | /   | /   | 2nd | 1st |
| 3 | MVME323        | /   | / | /   | /   | /   | 1st |
| 4 | MVME350        | /   | / | /   | 3rd | 2nd | 1st |
| 5 | MVME335        | /   | / | 3rd | 2nd | 1st | /   |
| 6 | MVME332XT      | /   | / | 3rd | 2nd | 1st | /   |
| 7 | MVME333        | /   | / | 3rd | 2nd | 1st | /   |
| 8 | MVME330-A or B | /   | / | 3rd | 2nd | 1st | /   |
| 9 | Filler Panel   | /   | / |     |     |     |     |

#### NOTES:

1. *Not recommended MVME332XT and MVME335 in one system.*
2. *Although supporting can work in other positions, the only supported ones are the unique configurations that result from using table above.*
3. *Install filler panels in empty slots for proper cooling.*
4. *In case MVME134 is installed it is located in the first card slot.*

The slots, numbered 1 through 6, are read from left to right when facing the component side of the backplane. The numerical references given for each slot for a given board (e.g. "1st", "2nd", "3rd") designate the preferred positions for that board.

The listing of modules from 1 to 9 in table above is also significant in determining which board is to be placed in which slot. The modules listed higher have preference over those that follow.

#### 4.2.1.6 Locator P9050-002 and 003 Rear Panel

Slots in the rear panel are numbered 6 through 1 on the enclosure, from left to right. Preferred positions for modules in the rear panel are shown in the table below.

|   | SLOT           | 6   | 5   | 4   | 3   | 2   | 1   |
|---|----------------|-----|-----|-----|-----|-----|-----|
| 1 | MVME716/134F-3 | /   | /   | /   | /   | /   | 1st |
| 2 | MVME715P/335   | /   | 2nd | 2nd | 1st | 1st | /   |
| 3 | MVME710/332XT  | /   | 2nd | 2nd | 1st | 1st | /   |
| 4 | MVME705A/333   | /   | 2nd | 2nd | 1st | 1st | /   |
| 5 | MVME330T/330A  | 1st | 2nd | 3rd | 4th | /   | /   |
| 6 | MVME330T/330B  | 1st | 2nd | 3rd | 4th | 5th | /   |
| 7 | MVME332PA1     | 1st | 2nd | 3rd | 4th | 5th | /   |
| 8 | Filler Panel   |     |     |     |     |     |     |

#### 4.2.1.7 Locator P9050-004 till 007 Backplane

|    | SLOT           | 1   | 2   | 3   | 4   | 5   | 6   |
|----|----------------|-----|-----|-----|-----|-----|-----|
| 1  | MVME132DOF     | 1st | /   | /   | /   | /   | /   |
| 2  | MVME204-2F     | /   | 1st | /   | /   | /   | /   |
| 3  | MVME205        | /   | 1st | /   | /   | /   | /   |
| 4  | MVME320B       | /   | /   | /   | /   | /   | 1st |
| 5  | MVME323        | /   | /   | /   | /   | 2nd | 1st |
| 6  | MVME350        | /   | /   | /   | 3rd | 2nd | 1st |
| 7  | MVME335        | /   | /   | 3rd | 2nd | 1st | /   |
| 8  | MVME332        | /   | /   | 3rd | 2nd | 1st | /   |
| 9  | MVME332XT      | /   | /   | 3rd | 2nd | 1st | /   |
| 10 | MVME333        | /   | /   | 3rd | 2nd | 1st | /   |
| 11 | MVME330-A or B | /   | /   | 3rd | 2nd | 1st | /   |
| 12 | Filler Panel   | /   | /   |     |     |     |     |

**NOTE:** Not recommended MVME332XT and MVME335 in one system.

#### 4.2.1.8 Locator P9050-004 till 007 Rear Panel

|   | SLOT            | 6   | 5   | 4   | 3   | 2   | 1   |
|---|-----------------|-----|-----|-----|-----|-----|-----|
| 1 | MVME707A/132DOF | /   | /   | /   | /   | /   | 1st |
| 2 | MVME715P/335    | /   | 1st | 1st | 2nd | 2nd | /   |
| 3 | MVME710/332XT   | /   | 1st | 1st | 2nd | 2nd | /   |
| 4 | MVME705A/333    | /   | 1st | 1st | 2nd | 2nd | /   |
| 5 | MVME330T/330A   | 1st | 2nd | 3rd | 4th | /   | /   |
| 6 | MVME330T/330B   | 1st | 2nd | 3rd | 4th | 5th | /   |
| 7 | MVME332PA1      | 1st | 2nd | 3rd | 4th | 5th | /   |
| 8 | Filler Panel    |     |     |     |     |     |     |

**NOTE:** Not recommended MVME332XT and MVME335 in one system.

#### 4.2.1.9 Locator P9050-303 till 308 Backplane

|    | SLOT          | 1   | 2   | 3   | 4   | 5   | 6 |
|----|---------------|-----|-----|-----|-----|-----|---|
| 1  | MVME147       | 1st | /   | /   | /   | /   | / |
|    | MVME147A      | 1st | 1st | /   | /   | /   | / |
|    | MVME147-1     | 1st | /   | /   | /   | /   | / |
|    | MVME147A-1    | 1st | 1st | /   | /   | /   | / |
| 2  | 1st MVME224-2 |     | 1st | 2nd | /   | /   | / |
| 3  | 2nd MVME224-2 |     |     | 1st | 2nd | /   | / |
| 4  | 1st MVME224-1 |     | 1st | 2nd | /   | /   | / |
| 5  | 2nd MVME224-1 |     |     | 1st | 2nd | /   | / |
| 6  | MVME374       |     |     |     | 1st | 2nd | / |
| 7  | MVME330-A     |     |     | 3rd | 2nd | 1st | / |
| 8  | MVME330-B     |     |     | 3rd | 2nd | 1st | / |
| 9  | 1st MVME332XT |     |     | 3rd | 2nd | 1st | / |
| 10 | 2nd MVME332XT |     |     |     | 2nd | 1st | / |
| 11 | 1st MVME333   |     |     | 1st | 2nd | 3rd | / |
| 12 | 2nd MVME333   |     |     |     | 1st | 2nd | / |
| 13 | MVME333X25    |     |     | 1st | 2nd | 3rd | / |
| 14 | MVME335       |     |     | 3rd | 2nd | 1st | / |
| 15 | MVME336       |     |     | 1st | 2nd | 3rd | / |
| 16 | MVME393       |     |     | 1st | 2nd | 3rd | / |
| 17 | Filler Panel  |     |     |     |     |     |   |

**NOTE:** Not recommended MVME332XT and MVME335 in one system.

#### 4.2.1.10 Locator P9050-303 till 308 Rear Panel

|    | SLOT            | 6   | 5   | 4   | 3   | 2   | 1   |
|----|-----------------|-----|-----|-----|-----|-----|-----|
| 1  | MVME712M/147    | /   | /   | /   | /   | 1st | 1st |
| 2  | MVME712A/147    | /   | /   | /   | /   | /   | 1st |
| 3  | MVME712B/147    | /   | /   | /   | /   | 1st | /   |
| 4  | MVME332PA1      | 1st | 2nd | 3rd | 4th | /   | /   |
| 5  | MVME710/332XT   | 1st | 1st | 2nd | 2nd | /   | /   |
| 6  | MVMELAN/330A B  | 1st | 2nd | /   | /   | /   | /   |
| 7  | MVMELAN/374     | 1st | 2nd | /   | /   | /   | /   |
| 8  | MVME705A/333    | 1st | 1st | 2nd | 2nd | /   | /   |
| 9  | MVME705B/333X25 | 1st | 2nd | /   | /   | /   | /   |
| 10 | MVME715P/335    | 1st | 1st | 2nd | 2nd | /   | /   |
| 11 | MVME751/336     | 1st | 2nd | 3rd | 4th | /   | /   |
| 12 | MVME792-2/393   | 1st | 2nd | /   | /   | /   | /   |
| 13 | Filler Panel    |     |     |     |     |     |     |

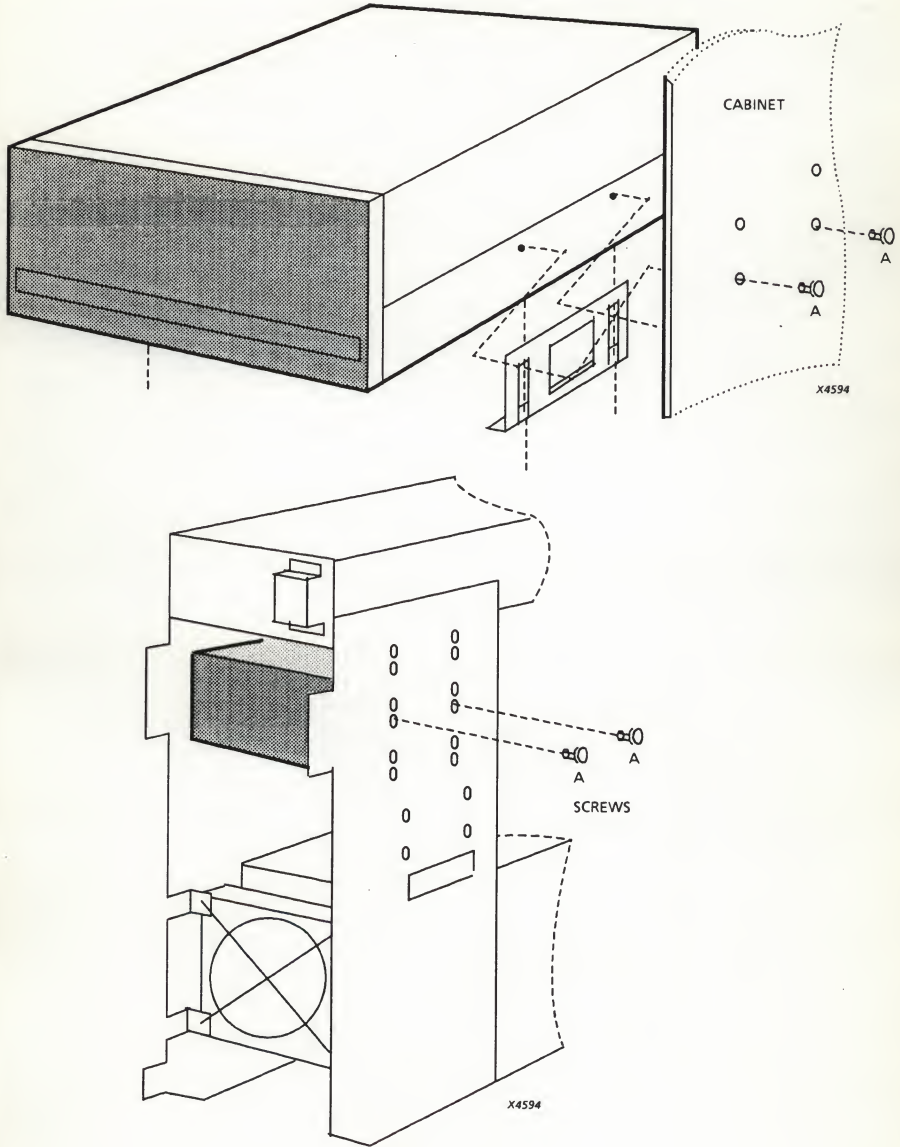
#### 4.2.1.11 Number of System Components, Disk and Tape Drives

| Module Number | Description                               | VME Slots Used | Maximum In System |
|---------------|-------------------------------------------|----------------|-------------------|
| MVME147       | 68030 20 Mhz 4Mb Pprocessor               | 1              | 1                 |
| MVME147A      | 68030 20 Mhz 8Mb Pprocessor               | 2              | 1                 |
| MVME147-1     | 68030 25 Mhz 4Mb Pprocessor               | 1              | 1                 |
| MVME147A-1    | 68030 25 Mhz 8Mb Pprocessor               | 2              | 1                 |
| MVME224-1     | 4Mb DRAM Memory Module                    | 1              | 2                 |
| MVME224-2     | 8Mb DRAM Memory Module                    | 1              | 2                 |
| MVME330-A     | OfficeLAN Ethernet LAN Controller         | 1              | 1                 |
| MVME330-B     | RFS Ethernet LAN Controller               | 1              | 1                 |
| MVME332XT     | 8-port Serial/Parallel Controller         | 1              | 2                 |
| MVME333       | Intelligent WAN Controller for SNA or BSC | 1              | 2                 |
| MVME333X25    | X.25 Controller                           | 1              | 1                 |
| MVME335       | Serial and Parallel I/O Module            | 1              | 1                 |
| MVME336       | DeltaLink Controller                      | 1              | 1                 |
| MVME338       | Serial I/O Controller                     | 1              | 4                 |
| MVME374       | Ethernet LAN Controller                   | 1              | 1                 |
| MVME393       | Graphics Controller                       | 1              | 1                 |



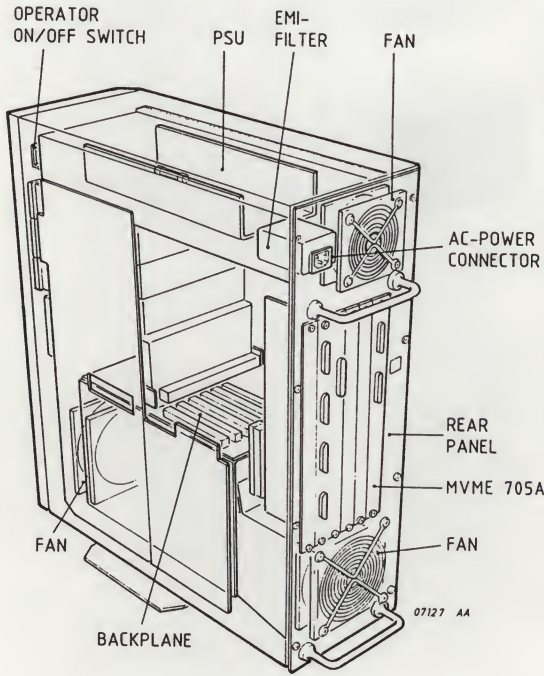
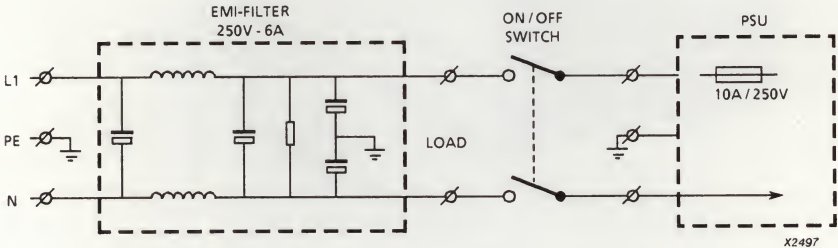
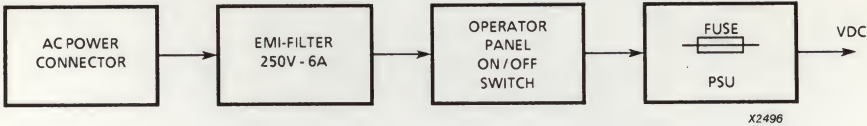
| Part Number | Description                              | Peripheral Slots Used | Maximum In System |
|-------------|------------------------------------------|-----------------------|-------------------|
| MVME852     | 60MB SCSI Streaming Tape Drive           | 1 half-height         | 1                 |
| MVME853     | 150MB SCSI Streaming Tape Drive          | 1 half-height         | 2                 |
| MVME872     | 48MB SCSI Winchester Disk Drive          | 1 half-height         | 2                 |
| MVME873     | 85MB SCSI Winchester Disk Drive          | 1 half-height         | 2                 |
| MVME874     | 150MB SCSI Winchester Disk Drive         | 1 full-height         | 1                 |
| MVME875     | 300MB SCSI Winchester Disk Drive         | 1 full-height         | 1                 |
| MVME876     | 600Mb SCSI Winchester Disk Drive         | 1 full-height         | 1                 |
| MVME877     | 1.2Gb SCSI Winchester Disk Drive         | 1 full-height         | 1                 |
| P3544-001   | M890/M891 9-track 6250 SCSI Tape Drive   | external device       | 1                 |
| P3549-001   | M990 9-track 6250 SCSI Tape Drive        | external device       | 1                 |
| MVME881     | 1.2Mb Diskette Drive and SCSI Controller | 1 full-height         | 1                 |

### 4.2.1.12 Mounting Disk and Tape Drives

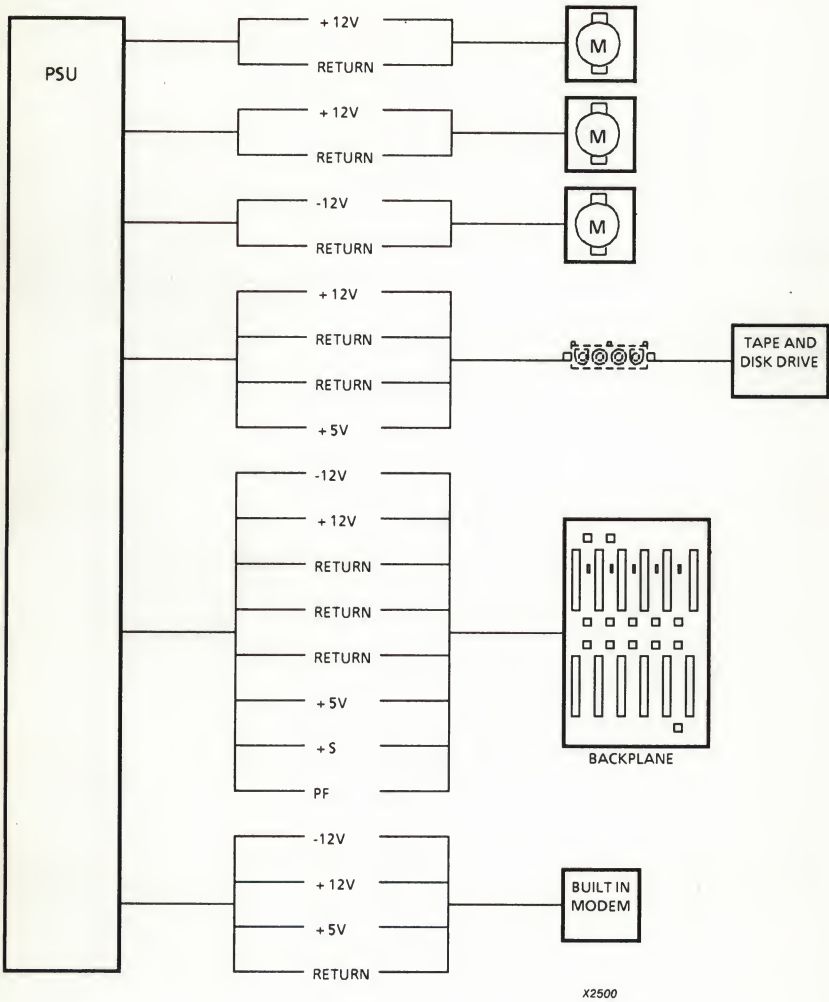


4.2.2 Power Distribution

4.2.2.1 Primary Circuit

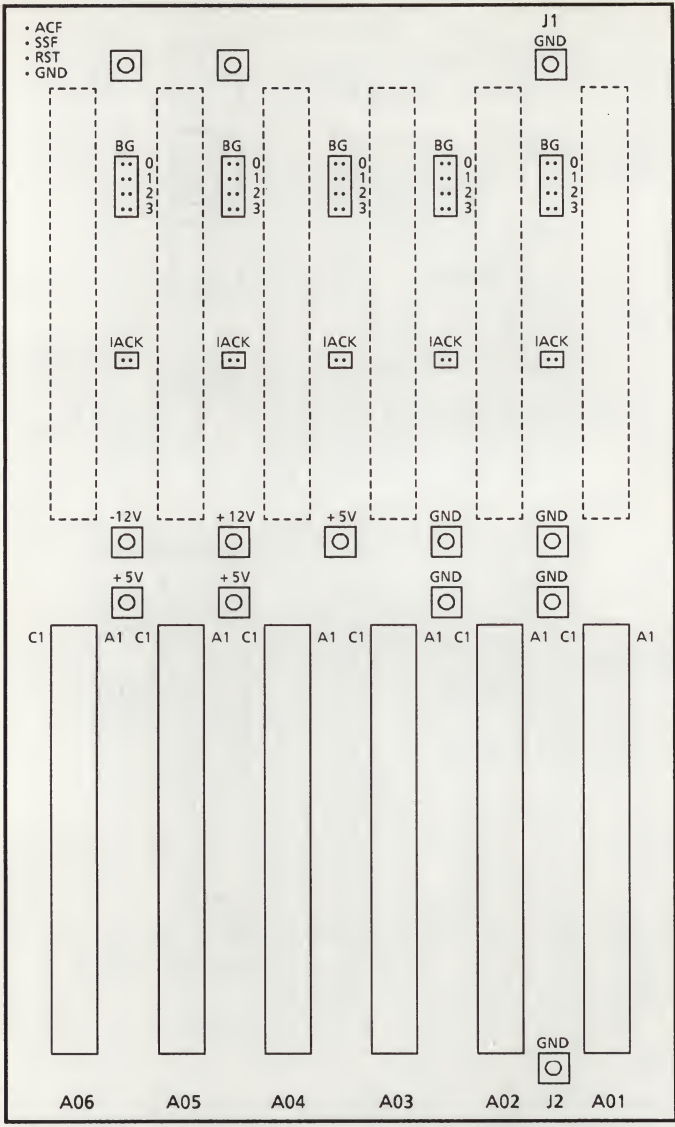


### 4.2.2.2 Secondary Circuit Blockdiagram





### 4.2.2.3 Backplane / Testpoints



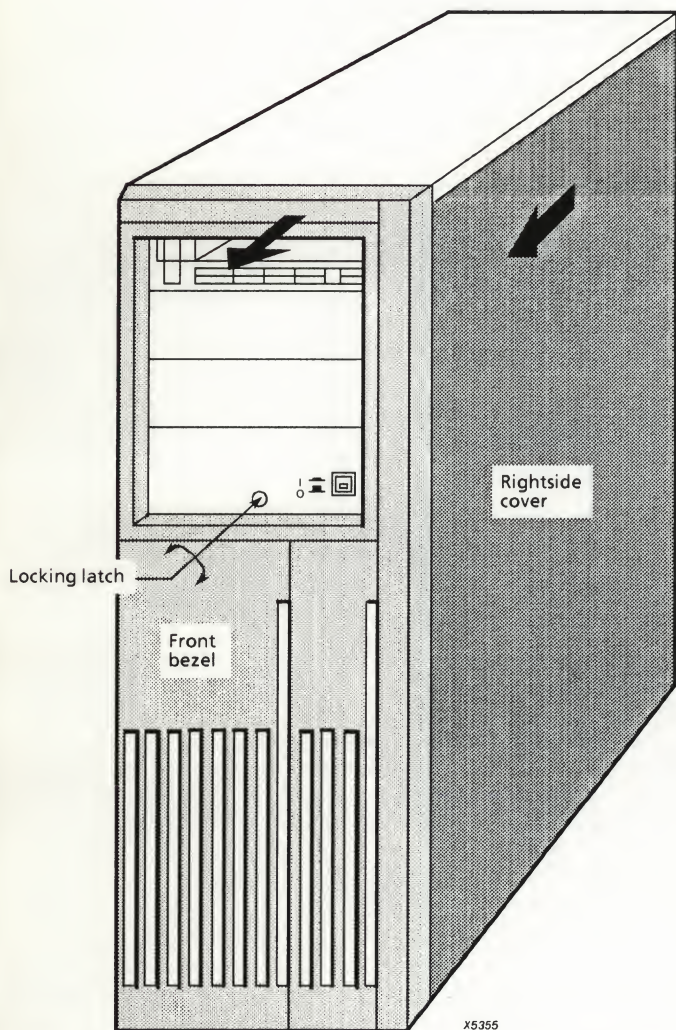
### 4.2.2.4 Pin Assignments Connectors

See section 4.4.2.5 and following.

### 4.3 P9045/P9050

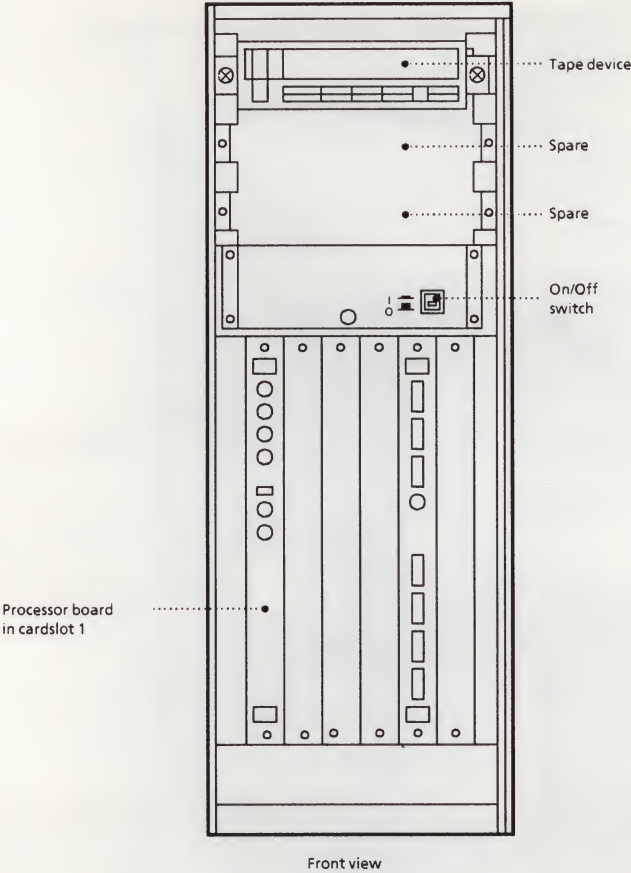
#### 4.3.1 Locators

##### 4.3.1.1 Locator P9045/P9050 (Removing System Enclosure)

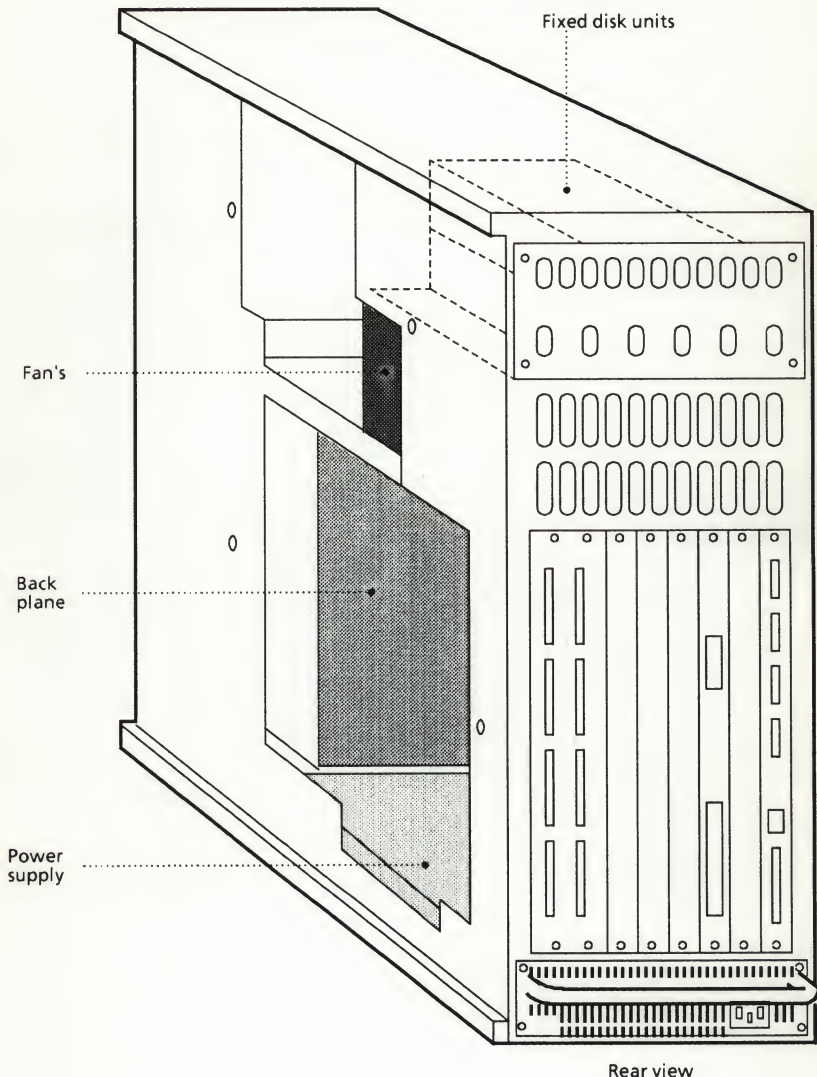


**NOTE :** First unlock the front bezel with a Phillips screw driver, then pull the front bezel from the cabinet.  
After that push the rightside cover forward and lift it.

4.3.1.2 Locator P9045/P9050 (Front view)

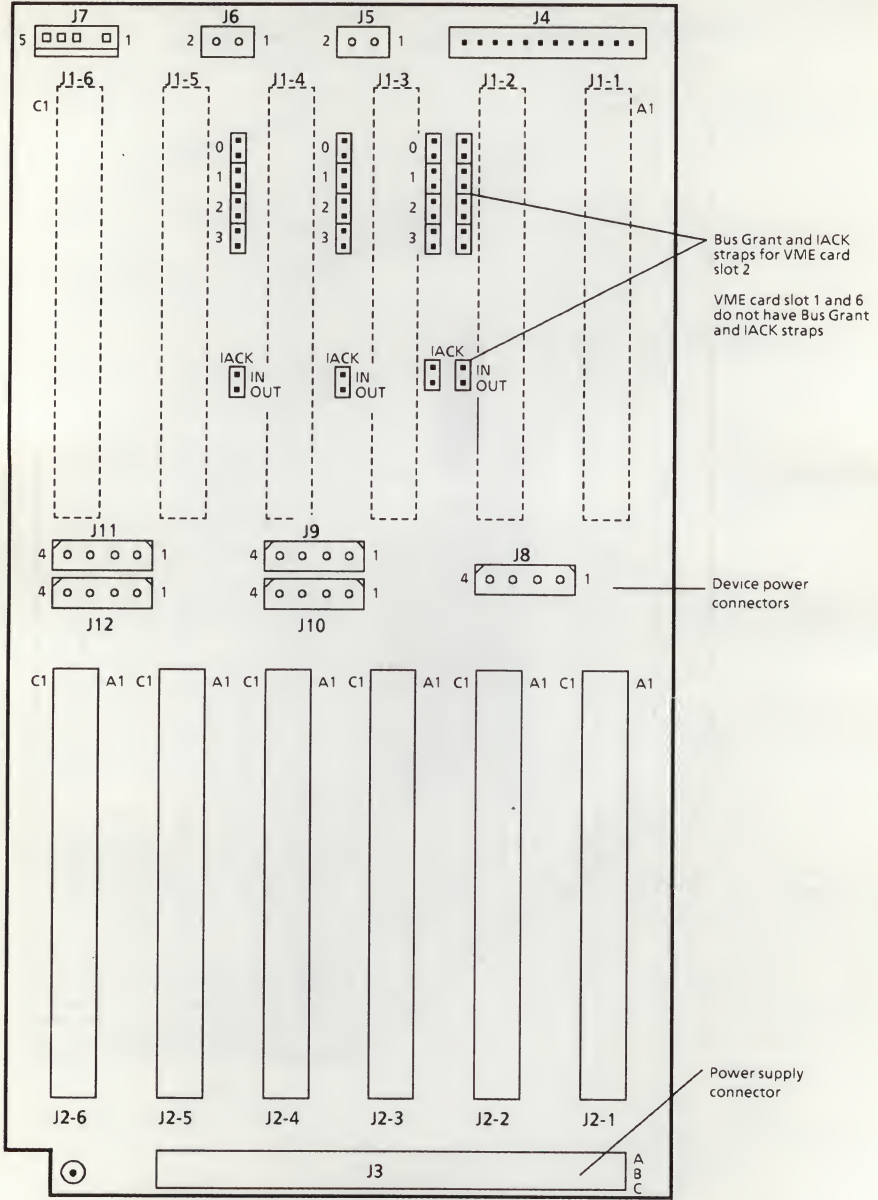


4.3.1.3 Locator P9045/P9050 (Backplane and Rear Panel)





4.3.1.4 P9045/P9050 Backplane / Connector Configuration



#### 4.3.1.5 Board Locator P9045/P9050 Card Cage

|    | SLOT                | 1   | 2   | 3   | 4   | 5   | 6 |
|----|---------------------|-----|-----|-----|-----|-----|---|
| 1  | MVME147S or MVME187 | 1st | /   | /   | /   | /   | / |
| 2  | 1st MVME224A-3      | /   | 1st | 2nd | /   | /   | / |
| 3  | 2nd MVME224A-3      | /   | /   | 1st | 2nd | /   | / |
| 4  | MVME374             | /   | /   | /   | 1st | 2nd | / |
| 5  | 1st MVME332XT       | /   | /   | 3rd | 2nd | 1st | / |
| 6  | 2nd MVME332XT       | /   | /   | /   | 2nd | 1st | / |
| 7  | 1st MVME333         | /   | /   | 1st | 2nd | 3rd | / |
| 8  | 2nd MVME333         | /   | /   | /   | 1st | 2nd | / |
| 9  | MVME333X25          | /   | /   | 1st | 2nd | 3rd | / |
| 10 | MVME335             | /   | /   | 3rd | 2nd | 1st | / |
| 11 | MVME336             | /   | /   | 1st | 2nd | 3rd | / |
| 12 | Filler Panel        |     |     |     |     |     |   |

**NOTE:** Not recommended MVME332XT and MVME335 in one system.

#### 4.3.1.6 Board Locator P9045/P9050 Rear Panel

|    | SLOT                 | 8 | 7   | 6   | 5   | 4   | 3   | 2   | 1   |
|----|----------------------|---|-----|-----|-----|-----|-----|-----|-----|
| 1  | MVME712A             | / | /   | /   | /   | /   | /   | /   | 1st |
| 2  | MVME712B or MVME712C | / | /   | /   | /   | /   | /   | 1st | /   |
| 3  | MVMELAN.374          | / | /   | /   | /   | /   | /   | 1st | /   |
| 4  | MVME710/332XT        | / | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   |
| 5  | MVME332PA2           | / | /   | 1st | 2nd | /   | /   | /   | /   |
| 6  | MVME705A/333         | / | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   |
| 7  | MVME705B/333X25      | / | 5th | 4th | 3rd | 2nd | 1st | /   | /   |
| 8  | MVME715P/335         | / | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   |
| 9  | MVME751/336          | / | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   |
| 10 | Filler Panel         |   |     |     |     |     |     |     |     |

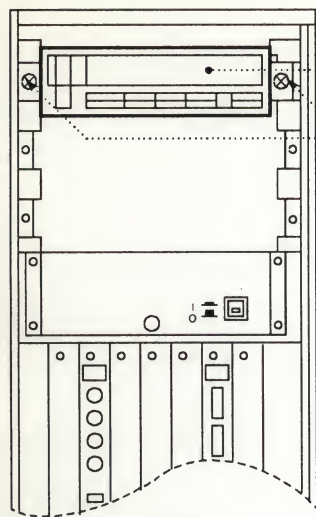
#### 4.3.1.7 Number of System Components, Disk and Tape Drives

| Module Name | Description                               | VME Slots Used | Maximum In System |
|-------------|-------------------------------------------|----------------|-------------------|
| MVME147S-1  | 68030 25 MHz 4Mb Processor                | 1              | 1                 |
| MVME147SA-1 | 68030 25 MHz 8Mb Processor                | 1              | 1                 |
| MVME147SB-1 | 68030 25 MHz 16Mb Processor               | 1              | 1                 |
| MVME147SC-1 | 68030 25 MHz 32Mb Processor               | 1              | 1                 |
| MVME187B    | 88100 25MHz 16Mb RISC Processor           | 1              | 1                 |
| MVME187C    | 88100 25MHz 32Mb RISC Processor           | 1              | 1                 |
| MVME224-2   | 8Mb DRAM Memory Module                    | 1              | 2                 |
| MVME224A-2  | 8Mb DRAM Memory Module                    | 1              | 2                 |
| MVME224A-3  | 16Mb DRAM Memory Module                   | 1              | 2                 |
| MVME332XT   | 8-port Serial/Parallel Controller         | 1              | 2                 |
| MVME333     | Intelligent WAN Controller for SNA or BSC | 1              | 2                 |
| MVME333X25  | X.25 Controller                           | 1              | 1                 |
| MVME335     | Serial and Parallel I/O Module            | 1              | 1                 |
| MVME336     | DeltaLink Controller                      | 1              | 1                 |
| MVME338     | Serial I/O Controller                     | 1              | 4                 |
| MVME374     | Ethernet LAN Controller                   | 1              | 1                 |

| Module Name | Description                              | Peripheral Slots Used | Maximum In System |
|-------------|------------------------------------------|-----------------------|-------------------|
| MVME853     | 150Mb SCSI Streaming Tape Drive          | 1 half-height         | 1                 |
| MVME854     | 525Mb SCSI Streaming Tape Drive          | 1 half-height         | 1                 |
| MVME855 *   | 155Mb SCSI Cassette Tape Drive           | 1 half-height         | 1                 |
| MVME856 *   | 2.3 Gb SCSI Tape Drive                   | 1 half-height         | 1                 |
| MVME863 *   | 104Mb SCSI Disk Drive 3.5"               | 1 half-height         | 2                 |
| MVME864 *   | 172 Mb SCSI Disk Drive 3.5"              | 1 half-height         | 2                 |
| MVME865     | 330Mb SCSI Disk Drive 3.5"               | 1 half-height         | 2                 |
| MVME866     | 520Mb SCSI Disk Drive 3.5"               | 1 half-height         | 2                 |
| MVME875     | 300Mb SCSI Disk Drive                    | 1 full-height         | 1                 |
| MVME876     | 600Mb SCSI Disk Drive                    | 1 full-height         | 1                 |
| MVME877     | 1.2Gb SCSI Disk Drive                    | 1 full-height         | 1                 |
| MVME884     | 2.9Mb Diskette Drive and SCSI Controller | 1 half-height         | 1                 |

\* Not in the P9050 RISC based systems

### 4.3.1.8 Mounting Disk and Tape Drives



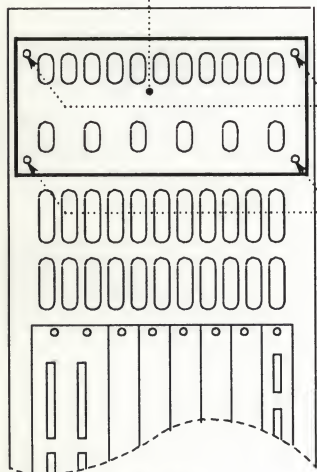
Front view

Tape device

2 Screws

To remove the tape (or FDD) you must unscrew the 2 screws

Hard disk bracket

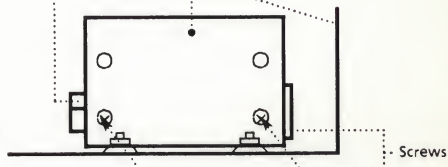


Rear view

Hard disk

Hard disk bracket

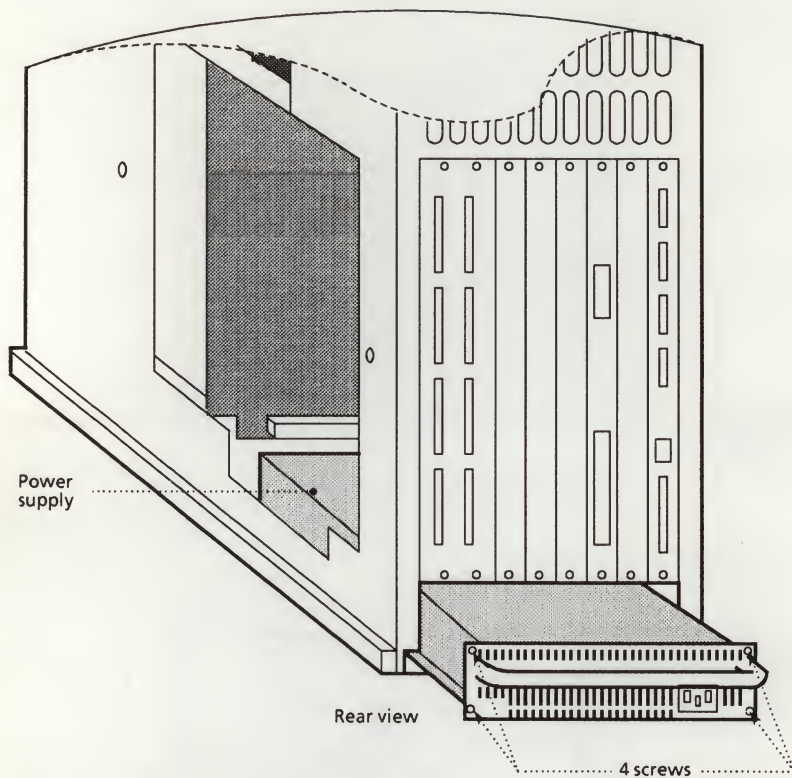
4 Screws



To remove the hard disk bracket you must unscrew the 4 screws  
than pull the hard disk bracket out of the system



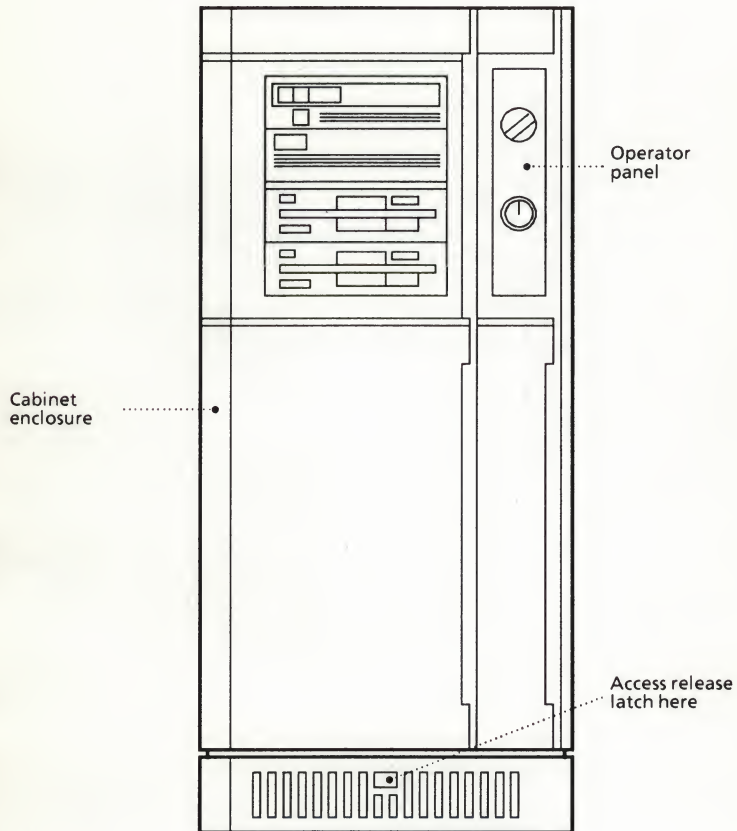
### 4.3.2 Power Distribution



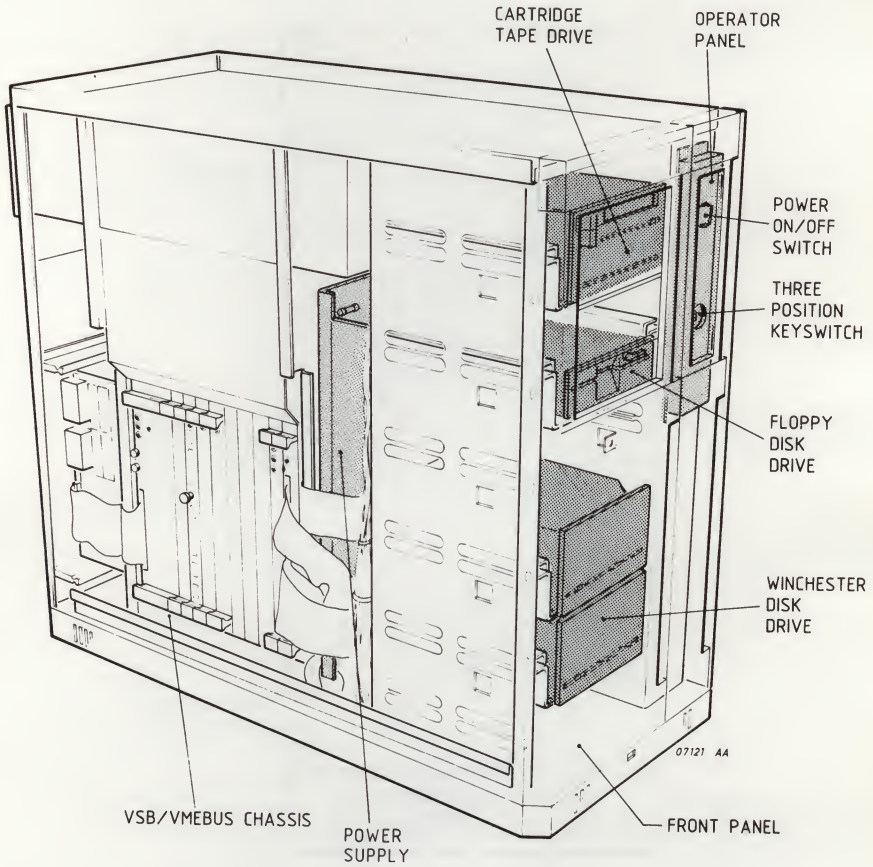
## 4.4 P9070

### 4.4.1 Locators

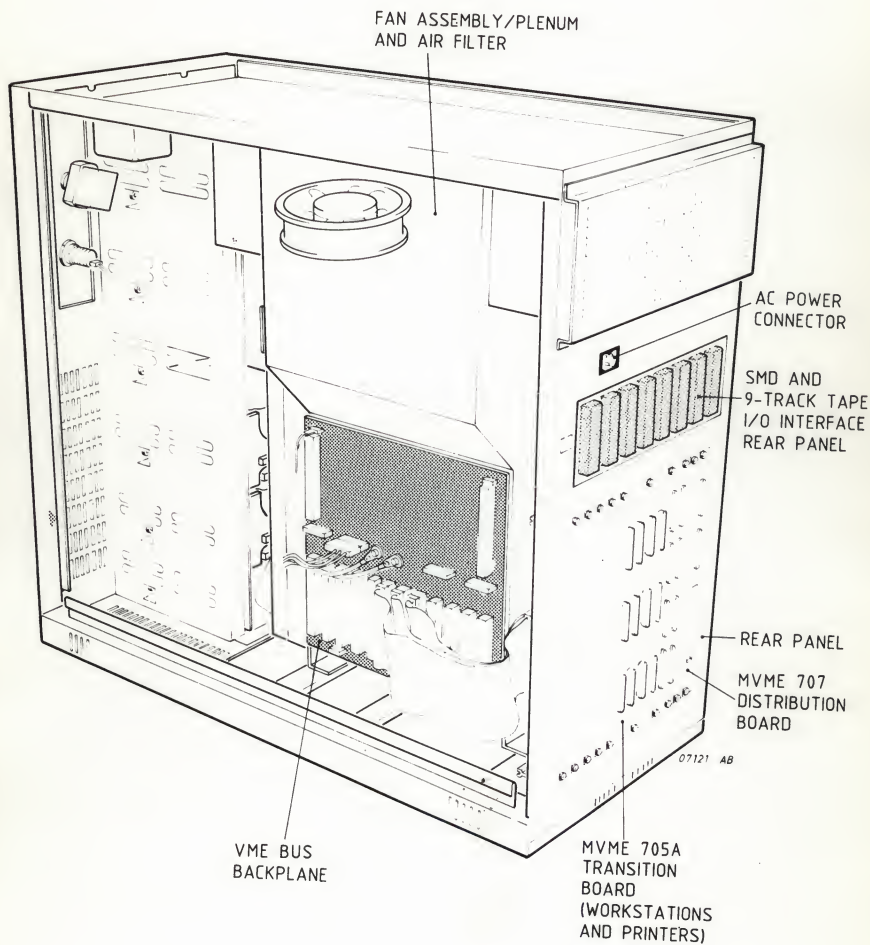
#### 4.4.1.1 Locator P9070 (Removing System Enclosure)



#### 4.4.1.2 Locator P9070 (VMEbus Chassis and Front Panel)

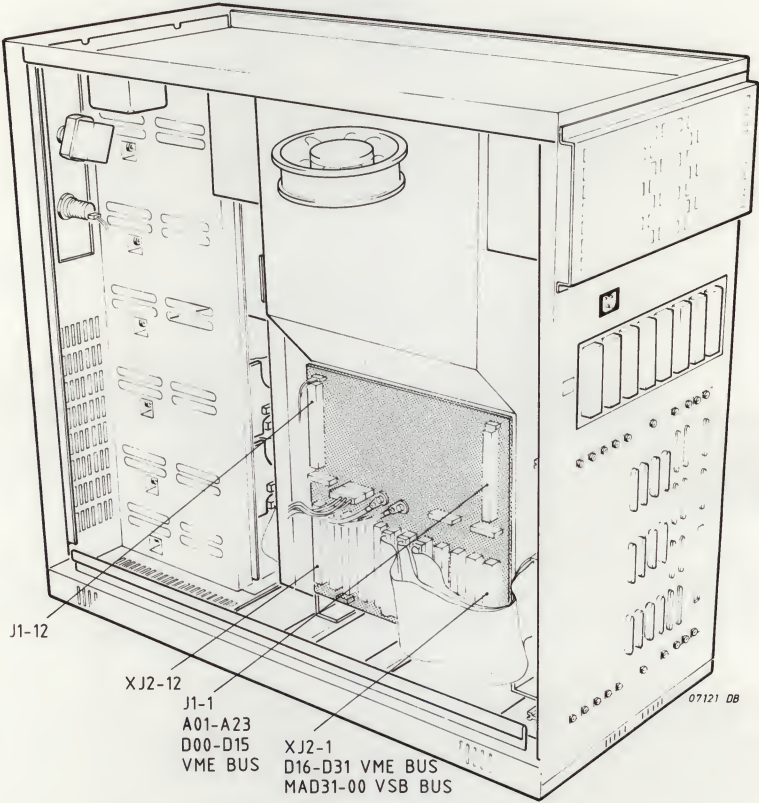


#### 4.4.1.3 Locator P9070 (Backplane and Rear Panel)

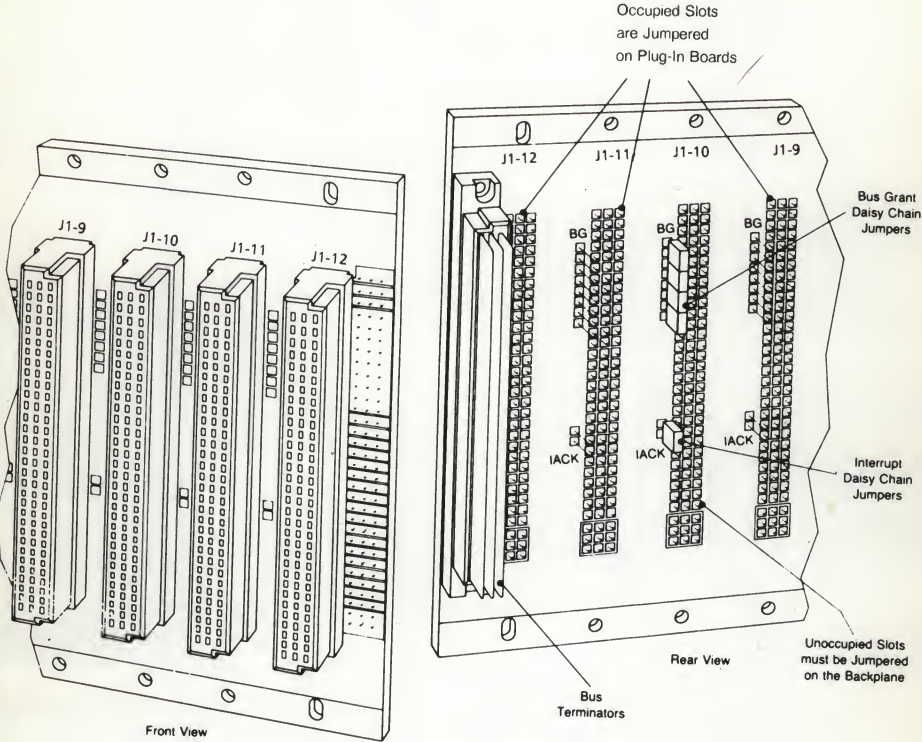




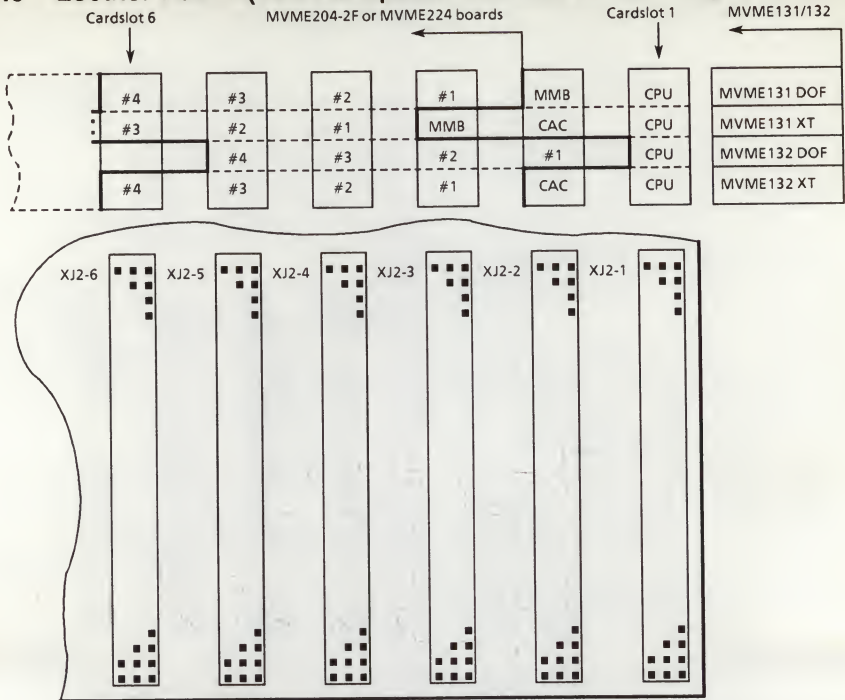
4.4.1.4 Locator P9070 (VME/VSBbus Chassis)



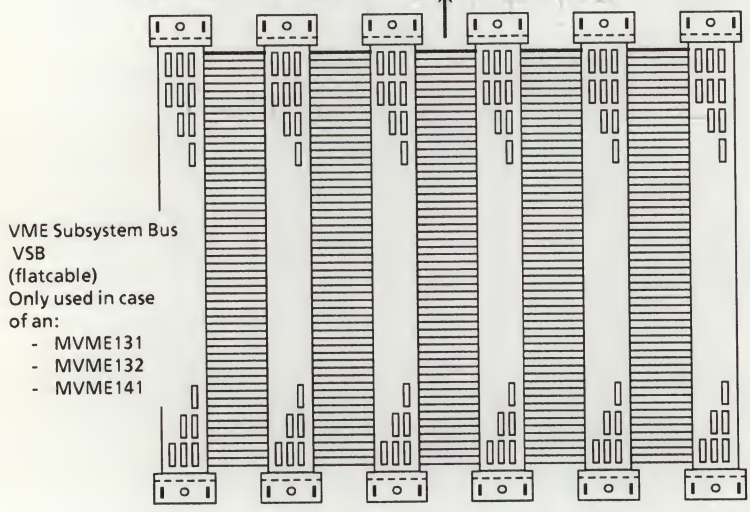
4.4.1.5 Locator P9070 (VMEbus Backplane)



#### 4.4.1.6 Locator P9070 (VSB Backplane - 6 Connector Configuration)



Rear view - VSB Backplane



#### 4.4.1.7 Locator P9070-xxx, 001 till 004 Backplane

|    | SLOT             | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
|----|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | MVME132DOF       | 1st | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   |
| 2  | MVME132XT        | 1st | 1st | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   |
| 3  | 1st MVME205      | /   | 1st | 2nd | 3rd | /   | /   | /   | /   | /   | /   | /   | /   |
| 4  | 2nd MVME205      | /   | /   | 1st | 2nd | 3rd | /   | /   | /   | /   | /   | /   | /   |
| 5  | 3rd MVME205      | /   | /   | /   | 1st | 2nd | 3rd | /   | /   | /   | /   | /   | /   |
| 6  | 1st MVME204-2F   | /   | 1st | 2nd | 3rd | /   | /   | /   | /   | /   | /   | /   | /   |
| 7  | 2nd MVME204-2F   | /   | /   | 1st | 2nd | 3rd | /   | /   | /   | /   | /   | /   | /   |
| 8  | 3rd MVME204-2F   | /   | /   | /   | 1st | 2nd | 3rd | /   | /   | /   | /   | /   | /   |
| 9  | 4th MVME204-2F   | /   | /   | /   | /   | 1st | 2nd | 3rd | /   | /   | /   | /   | /   |
| 10 | 1st MVME320 A B  | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | 2nd | 1st |
| 11 | 2nd MVME320 A/B* | /   | /   | /   | /   | /   | /   | /   | /   | /   | 2nd | 1st | /   |
| 12 | MVME323          | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | 1st |
| 13 | MVME350          | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | 1st | /   |
| 14 | 1st MVME360      | /   | /   | /   | /   | /   | /   | /   | /   | 3rd | 2nd | 1st | /   |
| 15 | 2nd MVME360      | /   | /   | /   | /   | /   | /   | /   | 3rd | 2nd | 1st | /   | /   |
| 16 | MVME355          | /   | /   | /   | /   | /   | /   | 4th | 3rd | 2nd | 1st | /   | /   |
| 17 | MVME330-B        | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | /   | /   |
| 18 | MVME330-A        | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | /   | /   |
| 19 | 1st MVME332      | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | /   | /   |
| 20 | 2nd MVME332      | /   | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | /   | /   |
| 21 | 3rd MVME332      | /   | /   | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | /   | /   |
| 22 | 4th MVME332      | /   | /   | /   | /   | /   | 1st | 2nd | 3rd | 4th | 5th | /   | /   |
| 23 | 1st MVME332XT    | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | /   | /   |
| 24 | 2nd MVME332XT    | /   | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | /   | /   |
| 25 | 3rd MVME332XT    | /   | /   | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | /   | /   |
| 26 | 4rd MVME332XT    | /   | /   | /   | /   | /   | 1st | 2nd | 3rd | 4th | 5th | /   | /   |
| 27 | 1st MVME333      | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | /   | /   |
| 28 | 2nd MVME333      | /   | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | /   | /   |
| 29 | MVME336          | /   | /   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |     |
| 30 | Filler Panel     | /   | /   |     |     |     |     |     |     |     |     |     |     |



1. The processor board (MVME132DOF or MVME132XT) always occupies the first slot(s).
2. The first MVME320A/B disk controller module always occupies slot 12. This is the slot closest to the disk drive.
3. The MVME350 streaming tape controller module occupies slot 11 if there is no 2nd MVME320A/B.
4. The MVME360 occupies slot 10 if slots 11 and 12 are filled; otherwise, it would be placed in the next unoccupied slot below slot 12.
5. The MVME355 is installed in the next unoccupied slot below the MVME320A, MVME350, and MVME360.
6. The MVME331, MVME332XT, and MVME333 are always installed immediately after the end of the VSB cable on the backplane, usually after slot 5.
7. The memory modules are always installed immediately following the processor board. These memory modules must reside on the VSB.
8. The MVME323 ESDI controller module occupies slot 12 if the MVME320A/B is not being used; if one MVME320A/B is being used, the MVME323 occupies slot 11.

#### 4.4.1.8 Locator P9070-xxx and 001 till 004 Rear panel

|    | SLOT                | 12  | 11  | 10  | 9   | 8   | 7   | 6   | 5   | 4   | 3   | 2   | 1   |
|----|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | MVME330T/330A       | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | 1st |
| 2  | MVME330T/330B       | /   | /   | /   | /   | /   | /   | /   | /   | /   | /   | 2nd | 1st |
| 3  | MVME707A            | /   | /   | /   | /   | /   | /   | /   | /   | /   | 3rd | 2nd | 1st |
| 4  | MVME332PA1          | /   | /   | /   | /   | /   | /   | /   | 4th | 3rd | 2nd | 1st | /   |
| 5  | MVME332PA2          | /   | /   | /   | /   | /   | /   | /   | 3rd | 2nd | 1st | /   | /   |
| 6  | 1st MVME710/SMM1437 | 5th | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   | /   |
| 7  | 2nd MVME710/SMM1437 | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   | /   | /   | /   |
| 8  | 3rd MVME710/SMM1437 | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   | /   | /   | /   | /   | /   |
| 9  | 4th MVME710/SMM1437 | 2nd | 2nd | 1st | 1st | /   | /   | /   | /   | /   | /   | /   | /   |
| 10 | 1st MVME705A/333    | 5th | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   | /   |
| 11 | 2nd MVME705A/333    | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   | /   | /   | /   |
| 12 | MVME715P            | 5th | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   | /   |
| 13 | MVME751/336         | 5th | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st | /   | /   |
| 14 | Filler Panel        | /   |     |     |     |     |     |     |     |     |     |     |     |

#### Rear Panel Connectors

| P1           | P2           | B2      | B1      | A       | B2      | B1      | A       |
|--------------|--------------|---------|---------|---------|---------|---------|---------|
| 9-track tape | 9-track tape | 2nd SMD | 2nd SMD | 2nd SMD | 1st SMD | 1st SMD | 1st SMD |

#### 4.4.1.9 Locator for P9070-300 till 308 Backplane

| 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11   | 12   | ← SLOT / PRIORITY |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-------------------|----|
| 1st |     |     |     |     |     |     |     |     |     |      |      | MVME147-1         | 1  |
| 1st | 1st |     |     |     |     |     |     |     |     |      |      | MVME147A-1        | 2  |
|     | 1st | 2nd |     |     |     |     |     |     |     |      |      | 1st MVME224-2     | 3  |
|     |     | 1st | 2nd |     |     |     |     |     |     |      |      | 2nd MVME224-2     | 4  |
|     | 1st | 2nd | 3rd |     |     |     |     |     |     |      |      | 1st MVME224-1     | 5  |
|     |     | 1st | 2nd |     |     |     |     |     |     |      |      | 2nd MVME224-1     | 6  |
|     | 1st | 2nd | 3rd | 4th |     |     |     |     |     |      |      | MVME330-A         | 7  |
|     | 1st | 2nd | 3rd | 4th | 5th |     |     |     |     |      |      | 1st MVME374       | 8  |
|     |     | 1st | 2nd | 3rd | 4th | 5th |     |     |     |      |      | 2nd MVME374       | 9  |
|     |     |     | 1st | 2nd | 3rd | 4th | 5th |     |     |      |      | 3rd MVME374       | 10 |
|     |     |     |     | 1st | 2nd | 3rd | 4th | 5th |     |      |      | 4th MVME374       | 11 |
|     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th |      |      | 5th MVME374       | 12 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th  |      | 6th MVME 374      | 13 |
|     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | MVME330-B         | 14 |
|     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 1st MVME332XT     | 15 |
|     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th  | 10th | 2nd MVME332XT     | 16 |
|     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th  | 9th  | 3rd MVME332XT     | 17 |
|     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th  | 8th  | 4th MVME332XT     | 18 |
|     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 1st MVME333       | 19 |
|     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th  | 10th | 2nd MVME333       | 20 |
|     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | MVME333x25        | 21 |
|     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | MVME336           | 22 |

#### 4.4.1.10 Locator for P9070-303 till 308 Rear Panel

| 12   | 11  | 10  | 9   | 8   | 7   | 6   | 5   | 4   | 3   | 2   | 1   | ← SLOT / PRIORITY |    |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------|----|
|      |     |     |     |     |     |     |     |     |     | 1st | 1st | MVME712M 147      | 1  |
|      |     |     |     |     |     |     |     |     |     |     | 1st | MVME712A 147      | 2  |
|      |     |     |     |     |     |     |     |     |     |     | 1st | MVME712B/147      | 3  |
|      |     |     |     |     |     |     |     |     | 1st |     |     | MVMELAN330-A      | 4  |
|      |     |     |     |     |     |     |     | 2nd | 1st |     |     | MVMELAN330-B      | 5  |
|      |     |     |     |     |     |     |     | 2nd | 1st |     |     | 1st MVMELAN374    | 6  |
|      |     |     |     |     |     |     | 2nd | 1st |     |     |     | 2nd MVMELAN374    | 7  |
|      |     |     |     |     |     | 2nd | 1st |     |     |     |     | 3rd MVMELAN374    | 8  |
|      |     |     |     | 2nd | 1st |     |     |     |     |     |     | 4th MVMELAN374    | 9  |
|      |     |     | 2nd | 1st |     |     |     |     |     |     |     | 5th MVMELAN374    | 10 |
|      |     |     |     |     |     |     |     |     |     |     |     | 6th MVMELAN374    | 11 |
|      |     | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     |     | MVME332PA1        | 12 |
|      | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     |     | MVME332PA2        | 13 |
| 5th  | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     | 1st MVME710 332XT | 14 |
| 4th  | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     |     |     | 2nd MVME710 332XT | 15 |
| 3rd  | 3rd | 2nd | 2nd | 1st | 1st |     |     |     |     |     |     | 3rd MVME710 332XT | 16 |
| 2nd  | 2nd | 1st | 1st |     |     |     |     |     |     |     |     | 4th MVME710 332XT | 17 |
| 5th  | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     | 1st MVME705A 333X | 18 |
| 4th  | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     |     |     | 2nd MVME705A 333X | 19 |
| 10th | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     |     | 1st MVME705B 333X | 20 |
| 9th  | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     |     |     | 2nd MVME705B 333X | 21 |
| 10th | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     |     | MVME751 336       | 22 |

#### 4.4.1.11 Locator for P9070-314 till 320 Backplane

| 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | ← SLOT / PRIORITY           |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------------------------|----|
| 1st |     |     |     |     |     |     |     |     |     |     |     | MVME141-2 or MVME141-3      | 1  |
|     | 1st |     |     |     |     |     |     |     |     |     |     | 1st MVME224-2 or MVME224A-2 | 2  |
|     |     | 1st |     |     |     |     |     |     |     |     |     | 2nd MVME224-2 or MVME224A-2 | 3  |
|     |     |     | 1st |     |     |     |     |     |     |     |     | 3rd MVME224-2 or MVME224A-2 | 4  |
|     |     |     |     | 1st |     |     |     |     |     |     |     | 4th MVME224-2 or MVME224A-2 | 5  |
|     | 1st | 2nd | 3rd | 4th |     |     |     |     |     |     |     | 1st MVME224A-3              | 6  |
|     |     | 1st | 2nd | 3rd |     |     |     |     |     |     |     | 2nd MVME224A-3              | 7  |
|     |     |     | 1st | 2nd |     |     |     |     |     |     |     | 3rd MVME224A-3              | 8  |
|     |     |     |     | 1st |     |     |     |     |     |     |     | 4th MVME224A-3              | 9  |
|     |     |     |     |     |     |     |     |     |     |     | 1st | MVME323-2                   | 12 |
|     |     |     |     |     |     |     |     |     |     | 1st |     | MVME350                     | 13 |
|     |     |     |     |     |     |     |     |     |     |     | 1st | MVME327A                    | 14 |
|     |     | 1st | 2nd | 3rd | 4th |     |     |     |     |     |     | MVME330-A                   | 15 |
|     |     | 1st | 2nd | 3rd | 4th | 5th |     |     |     |     |     | 1st MVME374                 | 16 |
|     |     |     | 1st | 2nd | 3rd | 4th | 5th |     |     |     |     | 2nd MVME374                 | 17 |
|     |     |     |     | 1st | 2nd | 3rd | 4th | 5th |     |     |     | 3rd MVME374                 | 18 |
|     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th |     |     | 4th MVME374                 | 19 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th |     | 5th MVME374                 | 20 |
|     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th |     | 6th MVME374                 | 21 |
|     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |     | MVME330-B                   | 22 |
|     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |     | 1st MVME332XT               | 23 |
|     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th |     | 2nd MVME332XT               | 24 |
|     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th |     | 3rd MVME332XT               | 25 |
|     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th |     | 4th MVME332XT               | 26 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th |     | 5th MVME332XT               | 27 |
|     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |     | 1st MVME333-2               | 28 |
|     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th |     | 2nd MVME333-2               | 29 |
|     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |     | MVME333X25                  | 30 |
|     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |     | MVME336                     | 32 |



#### 4.4.1.12 Locator for P9070-314 till 320 Rear Panel

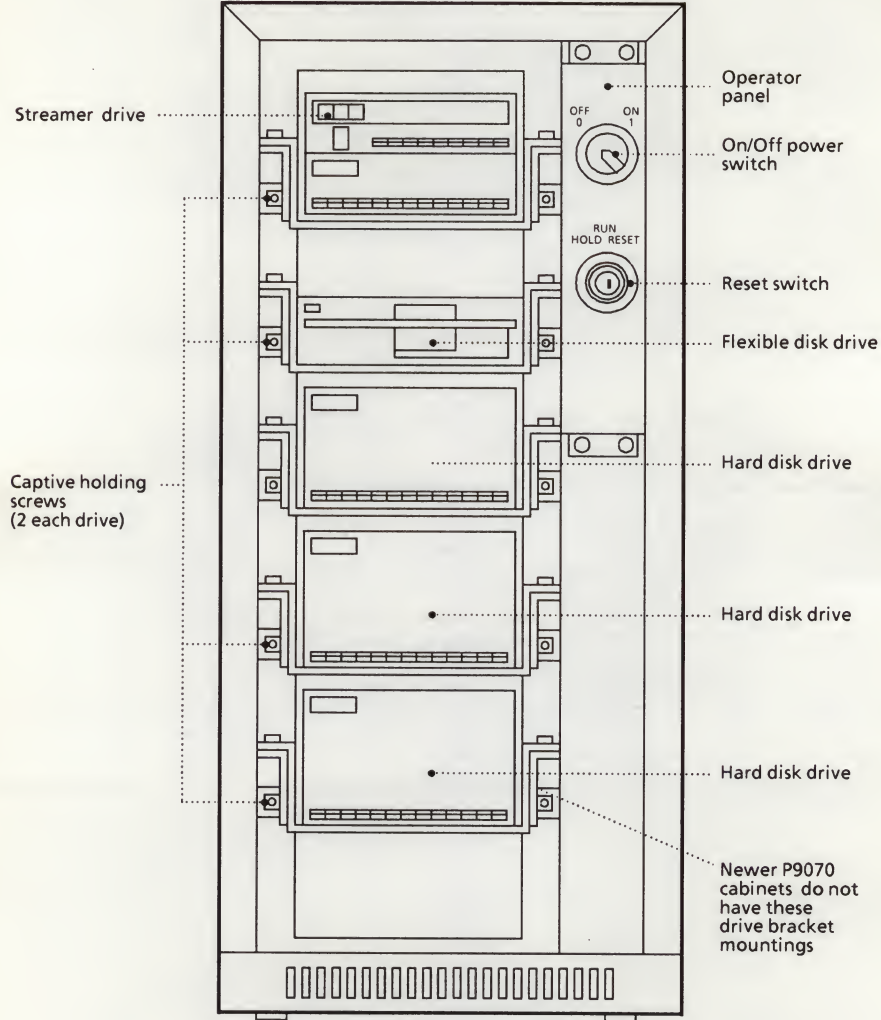
| 12   | 11   | 10  | 9   | 8   | 7   | 6   | 5   | 4   | 3   | 2   | 1   | ← SLOT / PRIORITY   |    |
|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------------------|----|
|      |      |     |     |     |     |     |     |     |     |     | 1st | MVME714M 141        | 1  |
| 1st  |      |     |     |     |     |     |     |     |     |     |     | MVME717 327         | 2  |
|      |      |     |     |     |     |     |     |     |     | 1st |     | MVMELAN330-A        | 3  |
|      |      |     |     |     |     |     |     |     | 2nd | 1st |     | MVMELAN330-B        | 4  |
|      |      |     |     |     |     |     |     |     | 2nd | 1st |     | 1st MVMELAN374      | 5  |
|      |      |     |     |     |     |     |     | 2nd | 1st |     |     | 2nd MVMELAN374      | 6  |
|      |      |     |     |     |     | 2nd | 1st |     |     |     |     | 3rd MVMELAN374      | 7  |
|      |      |     |     |     | 2nd | 1st |     |     |     |     |     | 4th MVMELAN374      | 8  |
|      |      |     |     | 2nd | 1st |     |     |     |     |     |     | 5th MVMELAN374      | 9  |
|      |      |     | 2nd | 1st |     |     |     |     |     |     |     | 6th MVMELAN374      | 10 |
|      |      | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     | MVME332PA2          | 11 |
|      | 5th  | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     | 1st MVME710/332XT   | 12 |
|      | 4th  | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     |     | 2nd MVME710/332XT   | 13 |
|      | 3rd  | 3rd | 2nd | 2nd | 1st | 1st |     |     |     |     |     | 3rd MVME710/332XT   | 14 |
|      | 2nd  | 2nd | 1st | 1st |     |     |     |     |     |     |     | 4thMVME710/332XT    | 15 |
|      | 1st  | 1st |     |     |     |     |     |     |     |     |     | 5thMVME710/332XT    | 16 |
|      | 5th  | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     | 1st MVME705A/333X25 | 17 |
|      | 4th  | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     |     | 2ndMVME705A/333X25  | 18 |
| 11th | 10th | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     | 1st MVME705B/333X25 | 19 |
| 10th | 9th  | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     |     | 2nd MVME705B/333X25 | 20 |
| 11th | 10th | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     | MVME751/336         | 21 |

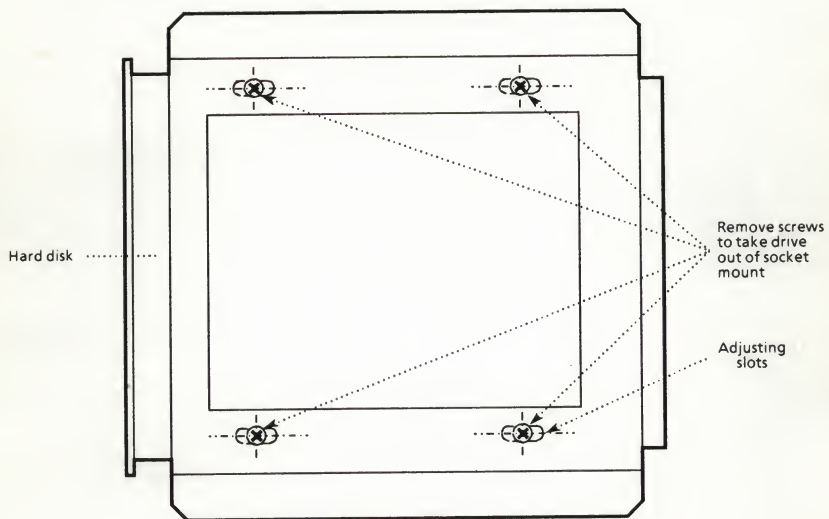
#### 4.4.1.13 Number of System Components, Disk and Tape Drives

| Module Name      | Description                               | VME Slots Used | Maximum in System |
|------------------|-------------------------------------------|----------------|-------------------|
| MVME141/147      | 68030 Cache Processor                     | 1              | 1                 |
| MVME224-2/224A-2 | 8Mb DRAM Memory Module                    | 1              | 4                 |
| MVME224A-3       | 16Mb DRAM Memory Module                   | 1              | 4                 |
| MVME323          | ESDI Winchester Disk Controller           | 1              | 1                 |
| MVME327A         | SCSI controller                           | 1              | 1                 |
| MVME330-A        | OFFICELAN Ethernet LAN Controller         | 1              | 1                 |
| MVME330-B        | RFS Ethernet LAN Controller               | 1              | 5                 |
| MVME332FXT       | 8-Port Serial/Parallel Controller         | 1              | 2                 |
| MVME333-2        | Intelligent WAN Controller for SNA or BSC | 1              | 1                 |
| MVME333X25       | X25 Controller                            | 1              | 1                 |
| MVME336          | DeltaLink Controller                      | 1              | 1                 |
| MVME338          | Terminal I/O System                       | 1              | 4                 |
| MVME350          | QIC-02 Streaming Tape Controller          | 1              | 1                 |
| MVME374          | Ethernet CU                               | 1              | 6                 |

| Module Name | Description                              | Peripheral Slots Used | Maximum in System |
|-------------|------------------------------------------|-----------------------|-------------------|
| MVME842     | 161Mb ESDI Winchester Disk Drive         | 1 full-height         | 3                 |
| MVME843     | 390Mb ESDI Winchester Disk Drive         | 1 full-height         | 3                 |
| MVME852Q    | 60Mb QIC-02 Streaming Tape Drive         | 1 full-height         | 1                 |
| MVME853Q    | 150Mb QIC-02 Streaming Tape Drive        | 1 half-height         | 1                 |
| MVME852     | 60MB SCSI Streaming Tape Drive           | 1 half-height         | 1                 |
| MVME853     | 150MB SCSI Streaming Tape Drive          | 1 half-height         | 2                 |
| MVME872     | 48Mb SCSI Winchester Disk Drive          | 1 half-height         | 2                 |
| MVME873     | 85Mb SCSI Winchester Disk Drive          | 1 half-height         | 3                 |
| MVME874     | 150Mb SCSI Winchester Disk Drive         | 1 full-height         | 3                 |
| MVME875     | 300Mb SCSI Winchester Disk Drive         | 1 full-height         | 3                 |
| MVME876     | 600Mb SCSI Winchester Disk Drive         | 1 full-height         | 3                 |
| MVME877     | 1.2Gb SCSI Winchester Disk Drive         | 1 full-height         | 3                 |
| MVME881     | 1.2Mb Diskette Drive and SCSI Controller | 1 full-height         | 1                 |

4.4.1.14 Mounting Disk and Tape Drives



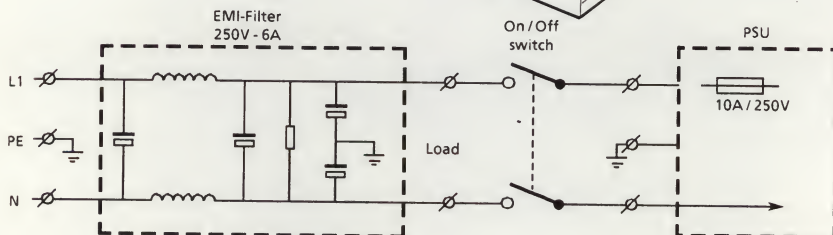
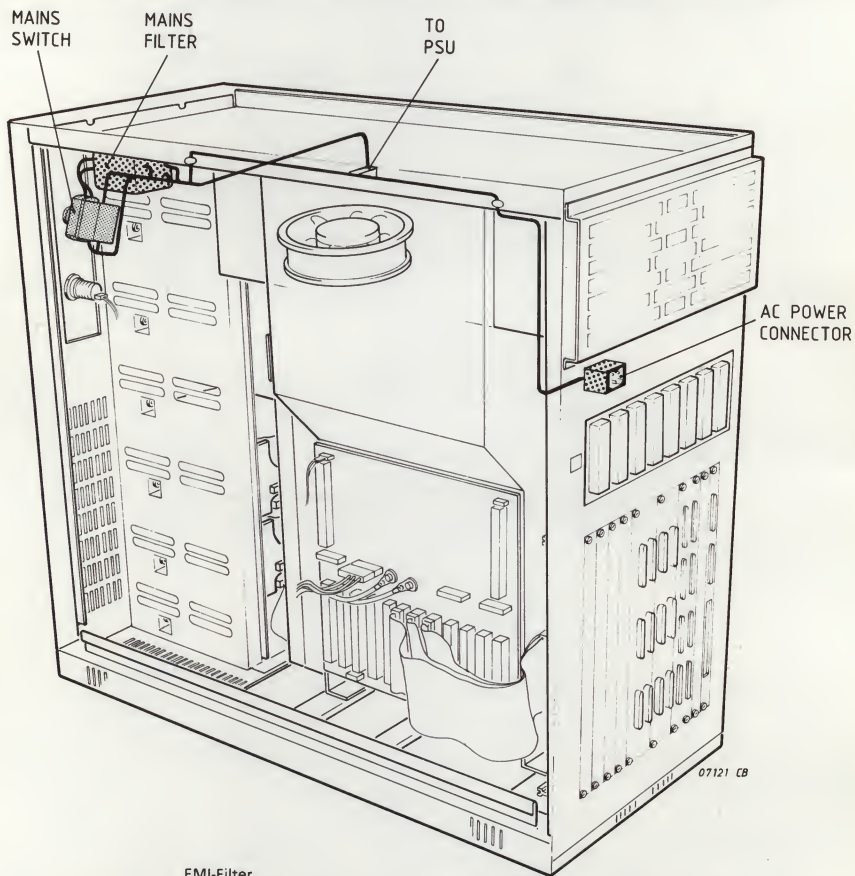
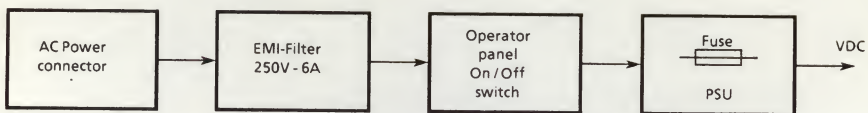


Drive bracket mounting, bottom view

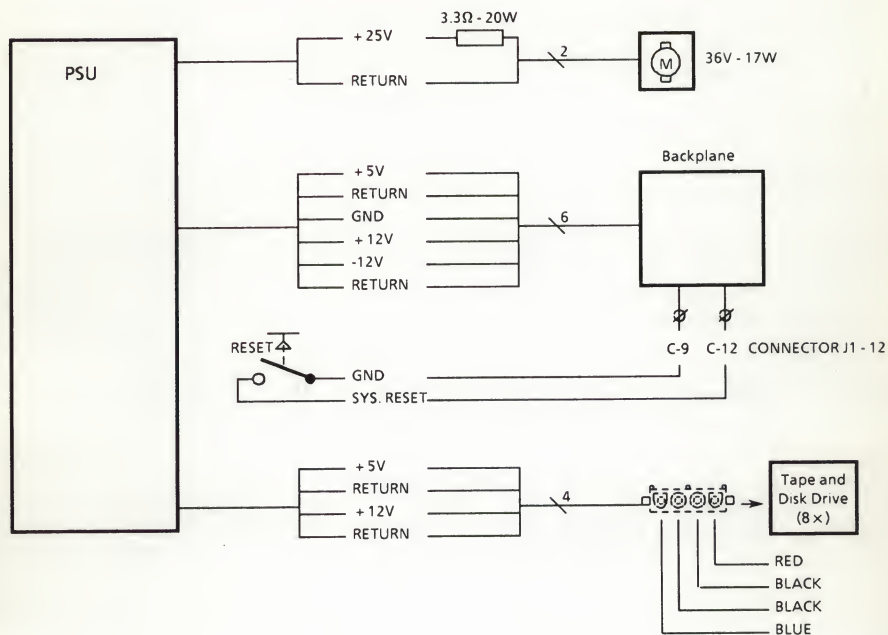


## 4.4.2 Power Distribution

### 4.4.2.1 Primary Circuit



#### 4.4.2.2 Secondary Circuit Blockdiagram

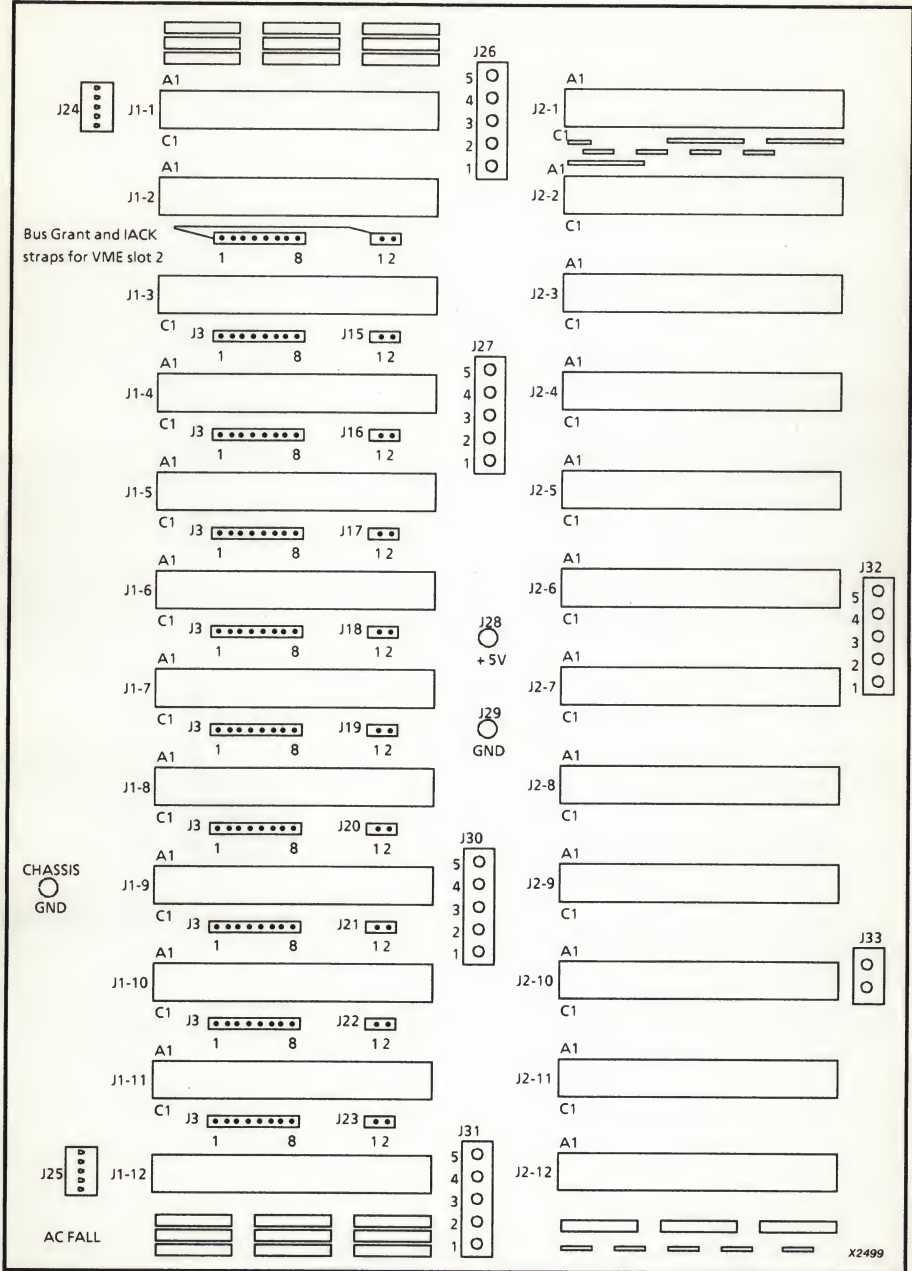


#### 4.4.2.3 Secondary Circuit Wiring Table

| From PSU      | Function        | 25mm <sup>2</sup> to | Nr. | 0.25 ÷ 2.5 mm <sup>2</sup> to   | Nr.    | Colour |
|---------------|-----------------|----------------------|-----|---------------------------------|--------|--------|
| TB2-1123<br>5 | Return +12V     | --                   | --  | Drives 1 ÷ 8                    | 8      | Black  |
| TB2-2         | Return +24V     | --                   | --  | Fan<br>J30-4 Backplane          | 1<br>1 | Black  |
| TB2-3         | Not used (-24V) | --                   | --  | --                              | --     | --     |
| TB-24         | +24V            | --                   | --  | Fan (via resistor)              | 1      | Yellow |
| TB2-5         | -12V            | --                   | --  | J30-5 Backplane                 | 1      | Orange |
| TB2-6         | +12V            | --                   | --  | Drives 1 ÷ 8<br>J30-3 Backplane | 8<br>1 | Blue   |
| STUD 1        | +5V             | J28 Backplane        | 1   | Drives 1 ÷ 8                    | 8      | Red    |
| STUD 2        | Return +5V      | J29 Backplane        | 1   | Drives 1 ÷ 8                    | 8      | Black  |
| P2-1          | AC-fail         | --                   | --  | J25-3 Backplane                 | 1      | Red    |

| FROM<br>BACKPLANE<br>J1-12 | FUNCTION | 0.25MM <sup>2</sup> TO | NR. | COLOUR |
|----------------------------|----------|------------------------|-----|--------|
| C-9                        | Ground   | Reset keyswitch        | 1   | Green  |
| C-12                       | Sysreset | Reset keyswitch        | 1   | Yellow |

4.4.2.4 Backplane / Testpoints





#### 4.4.2.5 Pin Assignments J1/P1 Connector

| PIN<br>NUMBER | ROW A<br>SIGNAL<br>MNEMONIC | ROW B<br>SIGNAL<br>MNEMONIC | ROW C<br>SIGNAL<br>MNEMONIC |
|---------------|-----------------------------|-----------------------------|-----------------------------|
| 1             | D00                         | BBSY *                      | D08                         |
| 2             | D01                         | BCLR *                      | D09                         |
| 3             | D02                         | ACFAIL *                    | D10                         |
| 4             | D03                         | BG0IN *                     | D11                         |
| 5             | D04                         | BG0OUT *                    | D12                         |
| 6             | 005                         | BG1IN *                     | D13                         |
| 7             | D06                         | BG1OUT *                    | D14                         |
| 8             | D07                         | BG2IN *                     | D15                         |
| 9             | GND                         | BG2OUT *                    | GND                         |
| 10            | SYSCLK                      | BG3IN *                     | SYSFAIL *                   |
| 11            | GND                         | BG3OUT *                    | BERR *                      |
| 12            | DS1 *                       | BR0 *                       | SYSRESET *                  |
| 13            | DS0 *                       | BR1 *                       | LWORD                       |
| 14            | WRITE *                     | BR2 *                       | AM5 *                       |
| 15            | GND                         | BR3 *                       | A23                         |
| 16            | DTACK *                     | AM0                         | A22                         |
| 17            | GND                         | AM1                         | A21                         |
| 18            | AS *                        | AM2                         | A20                         |
| 19            | GND                         | AM3                         | A19                         |
| 20            | IACK *                      | GND                         | A18                         |
| 21            | IACKIN *                    | SERCLK (1)                  | A17                         |
| 22            | IACKOUT *                   | SERDAT *(1)                 | A16                         |
| 23            | AM4                         | GND                         | A15                         |
| 24            | A07                         | IRQ7 *                      | A14                         |
| 25            | A06                         | IRQ6 *                      | A13                         |
| 26            | A05                         | IRQ5 *                      | A12                         |
| 27            | A04                         | IRQ4 *                      | A11                         |
| 28            | A03                         | IRQ3 *                      | A10                         |
| 29            | A02                         | IRQ2 *                      | A09                         |
| 30            | A01                         | IRQ1 *                      | A08                         |
| 31            | -12V                        | +5V STDBY                   | + 12V                       |
| 32            | + 5V                        | + 5V                        | + 5V                        |

- An asterisk (\*) following the signal name of signals which are level significant denotes that the signal is true or valid when the signal is low.
- An asterisk (\*) following the signal name of signals which are edge significant denotes that the actions initiated by that signal occur on a high to low transition.

#### 4.4.2.6 Pin Assignments J2/P2 Connector

| PIN<br>NUMBER | ROW A<br>SIGNAL<br>MNEMONIC | ROW B<br>SIGNAL<br>MNEMONIC | ROW C<br>SIGNAL<br>MNEMONIC |
|---------------|-----------------------------|-----------------------------|-----------------------------|
| 1             | User Defined                | + 5V                        | User Defined                |
| 2             | User Defined                | GND                         | User Defined                |
| 3             | User Defined                | RESERVED                    | User Defined                |
| 4             | User Defined                | A24                         | User Defined                |
| 5             | User Defined                | A25                         | User Defined                |
| 6             | User Defined                | A26                         | User Defined                |
| 7             | User Defined                | A27                         | User Defined                |
| 8             | User Defined                | A28                         | User Defined                |
| 9             | User Defined                | A29                         | User Defined                |
| 10            | User Defined                | A30                         | User Defined                |
| 11            | User Defined                | A31                         | User Defined                |
| 12            | User Defined                | GND                         | User Defined                |
| 13            | User Defined                | + 5V                        | User Defined                |
| 14            | User Defined                | D16                         | User Defined                |
| 15            | User Defined                | D17                         | User Defined                |
| 16            | User Defined                | D18                         | User Defined                |
| 17            | User Defined                | D19                         | User Defined                |
| 18            | User Defined                | D20                         | User Defined                |
| 19            | User Defined                | D21                         | User Defined                |
| 20            | User Defined                | D22                         | User Defined                |
| 21            | User Defined                | D23                         | User Defined                |
| 22            | User Defined                | GND                         | User Defined                |
| 23            | User Defined                | D24                         | User Defined                |
| 24            | User Defined                | D25                         | User Defined                |
| 25            | User Defined                | D26                         | User Defined                |
| 26            | User Defined                | D27                         | User Defined                |
| 27            | User Defined                | D28                         | User Defined                |
| 28            | User Defined                | D29                         | User Defined                |
| 29            | User Defined                | D30                         | User Defined                |
| 30            | User Defined                | D31                         | User Defined                |
| 31            | User Defined                | GND                         | User Defined                |
| 32            | User Defined                | + 5V                        | User Defined                |

#### 4.4.2.7 Pin Assignments VSB

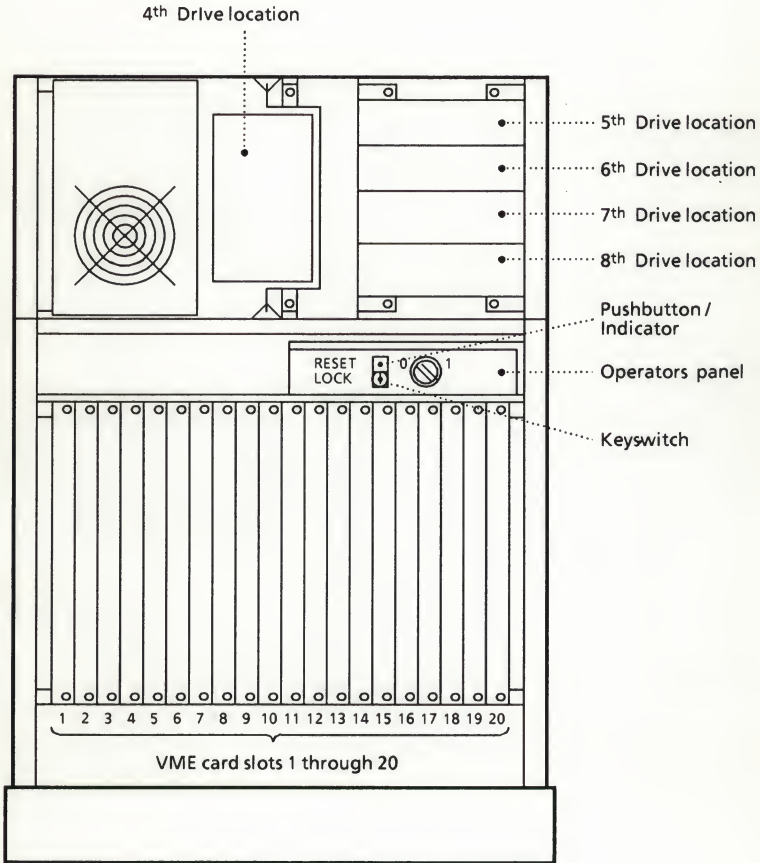
| NUMBER | ROW A  | ROW B        | ROW C    |
|--------|--------|--------------|----------|
| 1      | AD00   | + 5V         | AD01     |
| 2      | AD02   | GND          | AD03     |
| 3      | AD04   | User Defined | AD05     |
| 4      | AD06   | User Defined | AD07     |
| 5      | AD08   | User Defined | AD09     |
| 6      | AD10   | User Defined | AD11     |
| 7      | AD12   | User Defined | AD13     |
| 8      | AD14   | User Defined | AD15     |
| 9      | AD16   | User Defined | AD17     |
| 10     | AD18   | User Defined | AD19     |
| 11     | AD20   | User Defined | AD21     |
| 12     | AD22   | + 5V         | AD23     |
| 13     | AD24   | GND          | AD25     |
| 14     | AD26   | User Defined | AD27     |
| 15     | AD28   | User Defined | AD29     |
| 16     | AD30   | User Defined | AD31     |
| 17     | GND    | User Defined | GND      |
| 18     | IRQ *  | User Defined | GND      |
| 19     | DS *   | User Defined | GND      |
| 20     | WR *   | User Defined | GND      |
| 21     | SPACE0 | User Defined | SIZE0    |
| 22     | SPACE1 | GND          | PAS *    |
| 23     | LOCK * | User Defined | SIZE1    |
| 24     | ERR *  | User Defined | GND      |
| 25     | GND    | User Defined | ACK *    |
| 26     | GND    | User Defined | AC       |
| 27     | GND    | User Defined | ASACK1 * |
| 28     | GA0    | User Defined | ASACK0 * |
| 29     | GA1    | User Defined | CACHE *  |
| 30     | GA2    | User Defined | WAIT *   |
| 31     | BGIN * | + 5V         | BUSY *   |
| 32     | BREQ * | GND          | BGOUT *  |

**NOTE:** User defined in this case means DATA/ADDRESS expansion to 32 bits.

## 4.5 P9090

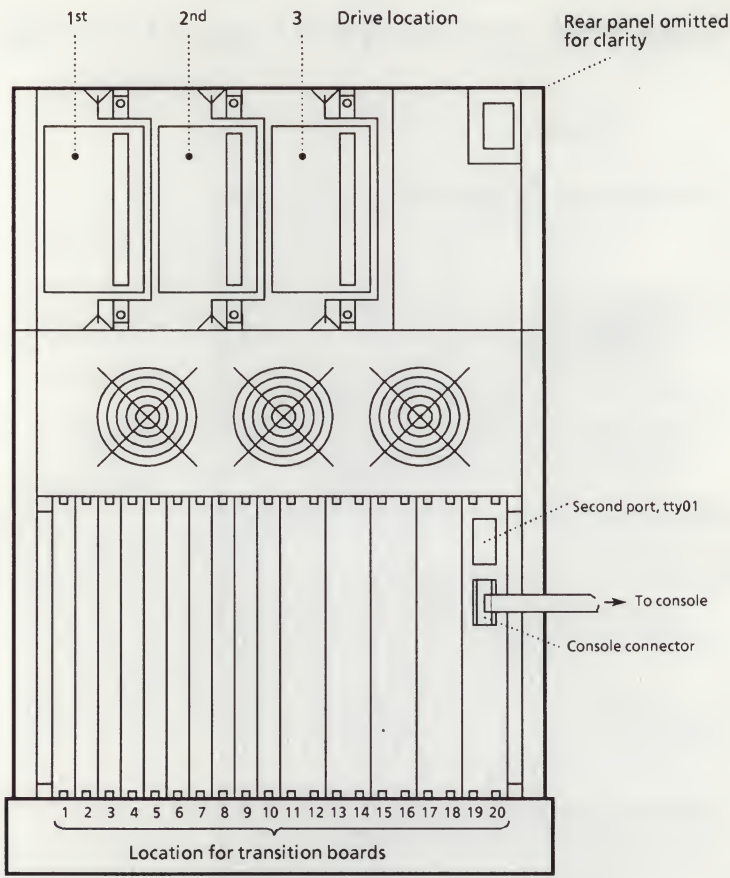
### 4.5.1 Locators

#### 4.5.1.1 Locator P9090 (Removing System Enclosure) Front View

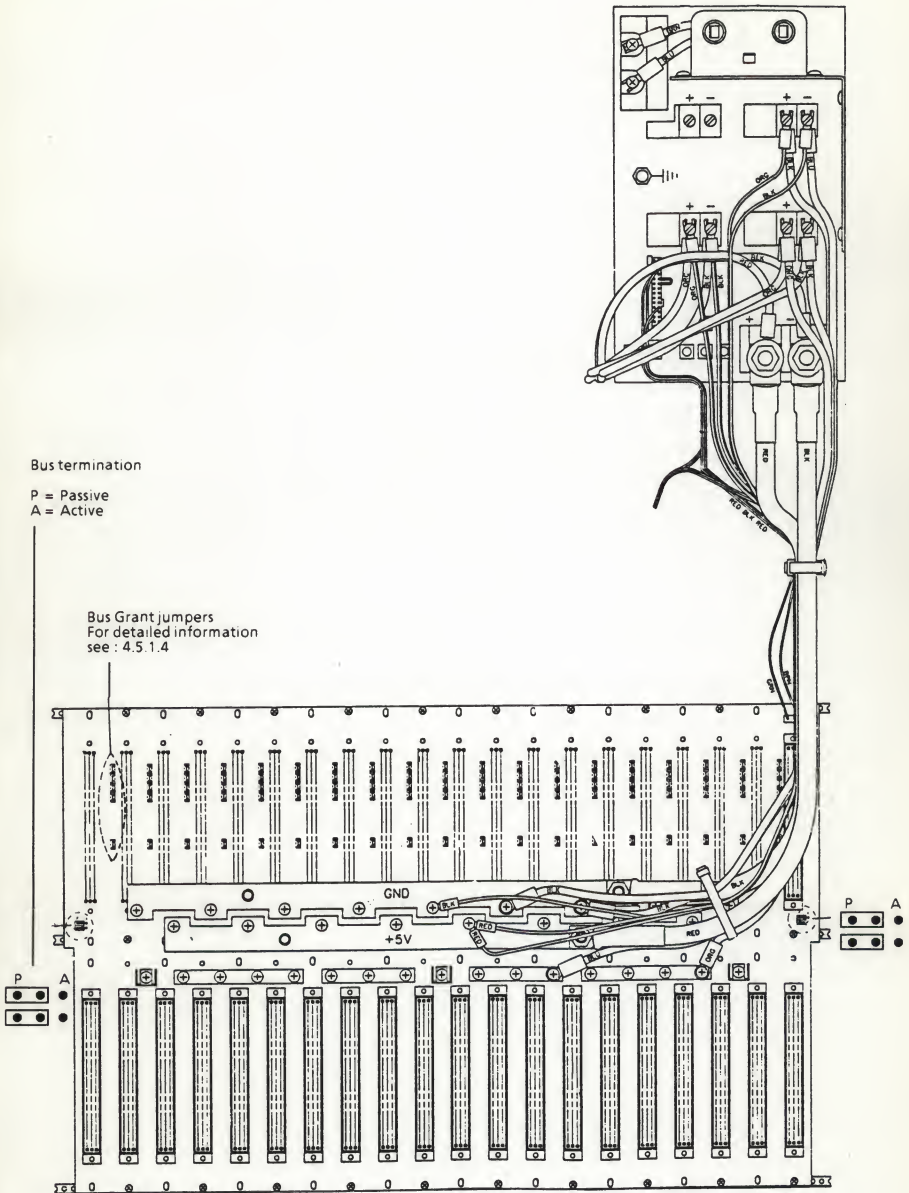




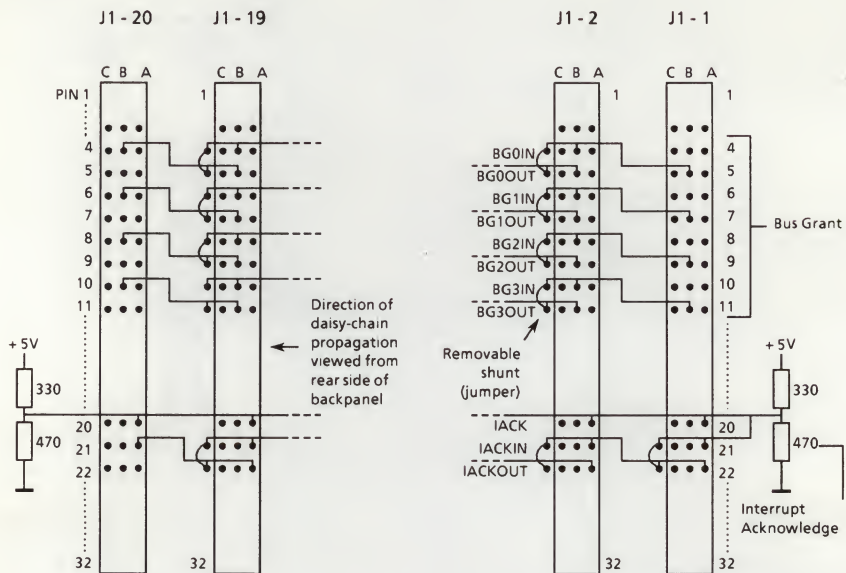
4.5.1.2 P9090 Rear View (Rear Panel Removed)



### 4.5.1.3 P9090 Backplane Connectors and Headers



#### 4.5.1.4 P9090 Backplane Daisy Chain Jumper Wiring



Backplane (rear view)

#### 4.5.1.5 Board Locator P9090 Card Cage

| 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16   | 17   | 18   | 19   | 20   | ← SLOT /<br>PRIORITY |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|----------------------|----|
| 1st |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |      |      |      | MVME141              | 1  |
|     | 1st |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 1st MVME224-2        | 2  |
|     |     | 1st |     |     |     |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 2nd MVME224-2        | 3  |
|     |     |     | 1st |     |     |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 3rd MVME224-2        | 4  |
|     |     |     |     | 1st |     |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 4th MVME224-2        | 5  |
|     |     |     |     |     | 1st |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 5th MVME224-2        | 6  |
|     | 1st | 2nd | 3rd | 4th | 5th |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 1st MVME224A-2       | 7  |
|     |     | 1st | 2nd | 3rd | 4th |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 2nd MVME224A-3       | 8  |
|     |     |     | 1st | 2nd | 3rd |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 3rd MVME224A-3       | 9  |
|     |     |     |     | 1st | 2nd |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 4th MVME224A-3       | 10 |
|     |     |     |     |     | 1st |     |     |     |     |     |     |     |     |     |      |      |      |      |      | 5th MVME224A-3       | 11 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |      |      | 1st  | MVME323-2            | 12 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |      | 1st  |      | MVME350              | 13 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      |      | 1st  |      | MVME327A             | 14 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      | 2nd  | 1st  |      | 1st MVME374          | 15 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      | 2nd  | 1st  |      | 2nd MVME374          | 16 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      | 2nd  | 1st  |      | 3rd MVME374          | 17 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      | 2nd  | 1st  |      | 4th MVME374          | 18 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      | 2nd  | 1st  |      | 5th MVME374          | 19 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |      | 2nd  | 1st  |      | 6th MVME374          | 20 |
|     |     |     |     |     |     |     |     |     |     |     | 8th | 7th | 6th | 5th | 4th  | 3rd  | 2nd  | 1st  |      | MVME330-A            | 21 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th |     |     |     |     |     |      |      |      |      |      | 1st MVME332XT        | 22 |
|     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th |     |     |     |     |      |      |      |      |      | 2nd MVME332XT        | 23 |
|     |     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th |     |     |     |      |      |      |      |      | 3rd MVME332XT        | 24 |
|     |     |     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th |     |     |      |      |      |      |      | 4th MVME332XT        | 25 |
|     |     |     |     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th |     |      |      |      |      |      | 5th MVME332XT        | 26 |
|     |     |     |     |     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th |      |      |      |      |      | 6th MVME332XT        | 27 |
|     |     |     |     |     |     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th  |      |      |      |      | 7th MVME332XT        | 28 |
|     |     |     |     |     |     |     |     |     |     |     |     |     | 1st | 2nd | 3rd  | 4th  |      |      |      | 8th MVME332XT        | 29 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th |      |      | 1st MVME333-2        | 30 |
|     |     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th  | 10th | 11th | 12th |      | 2nd MVME333-2        | 31 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th | 13th | 14th | MVME333X25           | 32 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th | 13th | 14th | MVME336              | 33 |
|     |     |     |     |     |     | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th | 13th | 14th | MVME338              | 33 |

**NOTE:** The MVME224-2 is replaced by the MVME224A-2



Board Locator P9090 RISC Card Cage

| 1                      | 2 | 3 | 4 | 5 | 6 | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16   | 17 | 18 | 19  | 20  | ← SLOT /<br>PRIORITY |    |
|------------------------|---|---|---|---|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|----|----|-----|-----|----------------------|----|
| First 6 Slots Reserved |   |   |   |   |   |     |     |     |     |     |     |     |     |     |      |    |    |     |     | MVME188(A)           | 1  |
|                        |   |   |   |   |   |     |     |     |     |     |     |     |     |     |      |    |    |     | 1st | MVME328              | 2  |
|                        |   |   |   |   |   |     |     |     |     |     |     |     |     |     |      |    |    | 1st |     | MVME374              | 3  |
|                        |   |   |   |   |   | 1st |     |     |     |     |     |     |     |     |      |    |    |     |     | 1st MVME332XT        | 4  |
|                        |   |   |   |   |   |     | 1st |     |     |     |     |     |     |     |      |    |    |     |     | 2nd MVME332XT        | 5  |
|                        |   |   |   |   |   |     |     | 1st |     |     |     |     |     |     |      |    |    |     |     | 3rd MVME332XT        | 6  |
|                        |   |   |   |   |   |     |     |     | 1st |     |     |     |     |     |      |    |    |     |     | 4th MVME332XT        | 7  |
|                        |   |   |   |   |   |     |     |     |     | 1st |     |     |     |     |      |    |    |     |     | 5th MVME332XT        | 8  |
|                        |   |   |   |   |   |     |     |     |     |     | 1st |     |     |     |      |    |    |     |     | 6th MVME332XT        | 9  |
|                        |   |   |   |   |   |     |     |     |     |     |     | 1st |     |     |      |    |    |     |     | 7th MVME332XT        | 10 |
|                        |   |   |   |   |   |     |     |     |     |     |     |     | 1st |     |      |    |    |     |     | 8th MVME332XT        | 11 |
|                        |   |   |   |   |   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th |    |    |     |     | 1st MVME333          | 12 |
|                        |   |   |   |   |   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |      |    |    |     |     | 2nd MVME333          | 13 |
|                        |   |   |   |   |   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th |    |    |     |     | 1st MVME333X25       | 14 |
|                        |   |   |   |   |   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |      |    |    |     |     | 2nd MVME333X25       | 15 |
|                        |   |   |   |   |   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |      |    |    |     |     | MVME336              | 16 |
|                        |   |   |   |   |   | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th |      |    |    |     |     | MVME338              | 17 |

#### 4.5.1.6 Board Locator P9090 Rear Panel

| 20   | 19   | 18   | 17   | 16   | 15   | 14   | 13   | 12   | 11   | 10  | 9   | 8   | 7   | 6   | 5   | 4   | 3   | 2   | 1   | ← SLOT / PRIORITY       |    |
|------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------|----|
|      |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     | 1st | MVME714M (141/188)      | 1  |
| 1st  |      |      |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     | 1st MVMEPAX/332XT       | 2  |
|      | 1st  |      |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     | 2nd MVMEPAX/332XT       | 3  |
| 1st  | 2nd  | 3rd  |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     | MVME LAN/330-A          | 4  |
| 1st  | 2nd  | 3rd  | 4th  |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     | 1st/6th MVME LAN/374    | 5  |
|      | 1st  | 2nd  | 3rd  | 4th  |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     | 2nd/5th MVME LAN/374    | 6  |
|      |      | 1st  | 2nd  | 3rd  | 4th  |      |      |      |      |     |     |     |     |     |     |     |     |     |     | 3rd/4th MVME LAN/374    | 7  |
|      |      |      | 1st  | 2nd  | 3rd  | 4th  |      |      |      |     |     |     |     |     |     |     |     |     |     | 4th/3rd MVME LAN/374    | 8  |
|      |      |      |      | 1st  | 2nd  | 3rd  | 4th  |      |      |     |     |     |     |     |     |     |     |     |     | 5th/2nd MVME LAN/374    | 9  |
|      |      |      |      |      | 1st  | 2nd  | 3rd  | 4th  |      |     |     |     |     |     |     |     |     |     |     | 6th/1st MVME LAN/374    | 10 |
| 1st  | 2nd  | 3rd  | 4th  | 5th  | 6th  | 7th  | 8th  | 9th  | 10th |     |     |     |     |     |     |     |     |     |     | MVME328 Trans. Mod.     | 11 |
|      |      |      |      |      |      |      |      |      |      |     | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     | 1st MVME710/332XT       | 12 |
|      |      |      |      |      |      |      |      |      | 4th  | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     |     | 2nd MVME710/332XT       | 13 |
|      |      |      |      |      |      |      | 4th  | 4th  | 3rd  | 3rd | 2nd | 2nd | 1st | 1st |     |     |     |     |     | 3rd MVME710/332XT       | 14 |
|      |      |      |      |      | 4th  | 4th  | 3rd  | 3rd  | 2nd  | 2nd | 1st | 1st |     |     |     |     |     |     |     | 4th MVME710/332XT       | 15 |
|      |      |      | 4th  | 4th  | 3rd  | 3rd  | 2nd  | 2nd  | 1st  | 1st |     |     |     |     |     |     |     |     |     | 5th MVME710/332XT       | 16 |
|      | 4th  | 4th  | 3rd  | 3rd  | 2nd  | 2nd  | 1st  | 1st  |      |     |     |     |     |     |     |     |     |     |     | 6th MVME710/332XT       | 17 |
|      | 3rd  | 2nd  | 1st  |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     | 7th MVME710/332XT       | 18 |
|      | 2nd  | 1st  |      |      |      |      |      |      |      |     |     |     |     |     |     |     |     |     |     | 8th MVME710/332XT       | 19 |
|      | 9th  | 9th  | 8th  | 8th  | 7th  | 7th  | 6th  | 6th  | 5th  | 5th | 4th | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     | 1st MVME705A/<br>333X25 | 20 |
|      | 8th  | 8th  | 7th  | 7th  | 6th  | 6th  | 5th  | 5th  | 4th  | 4th | 3rd | 3rd | 2nd | 2nd | 1st | 1st |     |     |     | 2nd MVME705A/<br>333X25 | 21 |
| 19th | 18th | 17th | 16th | 15th | 14th | 13th | 12th | 11th | 10th | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     | 1st MVME705B/<br>333X25 | 22 |
| 18th | 17th | 16th | 15th | 14th | 13th | 12th | 11th | 10th | 9th  | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     |     | 2nd MVME705B/<br>333X25 | 23 |
| 19th | 18th | 17th | 16th | 15th | 14th | 13th | 12th | 11th | 10th | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     | MVME751/336             | 24 |
| 19th | 18th | 17th | 16th | 15th | 14th | 13th | 12th | 11th | 10th | 9th | 8th | 7th | 6th | 5th | 4th | 3rd | 2nd | 1st |     | MVME338 Trans. Mod.     | 24 |

**NOTES:** In case of a P9090 RISC system:

- No MVME LAN/330
- Only 1 MVME LAN/374

#### 4.5.1.7 Number of System Components, Tapes and Disks

| Module Name      | Description                               | VME Slots Used | Maximum in system |
|------------------|-------------------------------------------|----------------|-------------------|
| MVME141-2        | 33 MHz Cache Processor                    | 1              | 1                 |
| MVME141-3        | 50 MHz Cache Processor                    | 1              | 1                 |
| MVME188(A)       | RISC processor module                     | 1              | 3 through 6       |
| MVME224-2/224A-2 | 8Mb DRAM Memory Module Non RISC           | 1              | 5                 |
| MVME224A-3       | 16Mb DRAM Memory Module Non RISC          | 1              | 5                 |
| MVME323-2        | ESDI Winchester Disk Controller           | 1              | 1                 |
| MVME327A         | High Performance SCSI Controller Non RISC | 1              | 1                 |
| MVME328          | High Performance SCSI Controller          | 1              | 2                 |
| MVME330-A        | OfficeLAN Controller                      | 1              | 1                 |
| MVME332XT        | 8-Port Serial/Parallel Controller         | 1              | 8                 |
| MVME333-2        | Intelligent WAN Controller for SNA or BSC | 1              | 2                 |
| MVME333X25       | X25 Controller                            | 1              | 2                 |
| MVME350          | QIC-02 Streaming Tape Controller Non RISC | 1              | 1                 |
| MVME336          | DeltaLink Controller                      | 1              | 1                 |
| MVME338          | Serial I/O Controller                     | 1              | 4                 |
| MVME374          | Ethernet LAN Controller                   | 1              | 6                 |

| Module Name | Description                           | Peripheral Slots Used | Maximum in system |
|-------------|---------------------------------------|-----------------------|-------------------|
| MVME843     | 390Mb ESDI Winchester Disk Drive      | 1 full-height         | 4                 |
| MVME865     | 320Mb SCSI Winchester Disk Drive 3.5" | 1 half-height         | 4                 |
| MVME866     | 520Mb SCSI Winchester Disk Drive 3.5" | 1 half-height         | 4                 |
| MVME875     | 300Mb SCSI Winchester Disk Drive      | 1 full-height         | 4                 |
| MVME876     | 600Mb SCSI Winchester Disk Drive      | 1 full-height         | 4                 |
| MVME877     | 1.2Gb SCSI Winchester Disk Drive      | 1 full-height         | 4                 |
| MVME852     | 60Mb SCSI Streaming Tape Drive        | 1 full-height         | 1                 |
| MVME853     | 150Mb SCSI Streaming Tape Drive       | 1 half-height         | 2                 |
| MVME853-Q   | 150Mb QIC-02 Streaming Tape           | 1 half-height         | 1                 |
| MVME854     | 525Mb SCSI Streaming Tape Drive       | 1 half-height         | 1                 |
| MVME881A    | 1.2Mb SCSI Diskette Drive             | 1 half-height         | 1                 |
| MVME883     | 1.2Mb Diskette Drive                  | 1 half-height         | 1                 |
| MVME856     | 2Gb SCSI Cartridge Tape Subsystem     | 1 full-height         | 1                 |

### 4.5.1.8 Mounting Disk and Tape Drives

P9090 rear side

Bracket  
fixing screws

Mounting screws (4)

Disk drive mounted  
in a drive mounting  
bracket

P9090 frontside

Mounting screws  
Per device two at  
each side

Drive  
mounting  
bracket

Bracket  
fixing screws  
Four in total





| Module Name                                                                                      | VME<br>Short/Extended<br>Address                                                             | Interrupt<br>Level | Bus Request/<br>Bus Grant<br>Level |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------|------------------------------------|
| MVME131/132<br>MVME13x ROM<br>MVME13x SRAM                                                       | FFF00000<br>FFF20000                                                                         |                    | 0                                  |
| MVME134<br>MVME134 ROM<br>MVME134 NVRAM                                                          | FFF00000<br>FFFC0000                                                                         |                    | 0                                  |
| MVME141<br>MVME141 ROM<br>MVME141 SRAM<br>MVME141 NVRAM                                          | FFF00000<br>FFF40000<br>FFF50000                                                             |                    | 0                                  |
| MVME147<br>MVME147 ROM<br>MVME147 NVRAM<br>MVME147 LAN<br>MVME147 SCSI                           | FF800000<br>FFFE0000<br>FFFE1800<br>FFFE4000                                                 |                    | 0                                  |
| MVME187<br>MVME187 ROM<br>MVME187 SRAM<br>MVME187 LAN<br>MVME187 SCSI<br>MVME187 NVRAM           | FF800000<br>FFE00000<br>FFF46000<br>FFF47000<br>FFFC0000                                     |                    | 0                                  |
| MVME188(A)<br>MVME188 ROM<br>MVME188 SRAM<br>MVME188 NVRAM                                       | FFC00000<br>FFFE0000<br>FFF80000                                                             |                    | 0                                  |
| See note<br>MVME2x4<br>MVME2x4<br>MVME2x4<br>MVME2x4<br>MVME2x4<br>MVME2x4<br>MVME2x4<br>MVME2x4 | FFFFBEx1<br>FFFFBEx3<br>FFFFBEx5<br>FFFFBEx7<br>FFFFBEx9<br>FFFFBExB<br>FFFFBExD<br>FFFFBExF |                    |                                    |
| MVME205 # 1<br>MVME205 # 2<br>MVME205 # 3<br>MVME205 # 4<br>MVME205 # 5                          | FFFFFEE0<br>FFFFFEE2<br>FFFFFEE4<br>FFFFFEE6<br>FFFFFEE8                                     |                    |                                    |

**Note:** CSR-addresses of the MVME2x4 boards on borders of 2Mbyte, x runs from 0 through 7.

| Module Name    | VME<br>Short/Extended<br>Address | Interrupt<br>Level | Bus Request/<br>Bus Grant<br>Level |
|----------------|----------------------------------|--------------------|------------------------------------|
| MVME320 # 1    | FFFFB000                         | 5                  | 3                                  |
| MVME320 # 2    | FFFFAC00                         | 5                  | 3                                  |
| MVME323 # 1    | FFFAA000                         | 3                  | 1                                  |
| MVME323 # 2    | FFFAA200                         | 3                  | 1                                  |
| MVME327A # 1   | FFFAA600                         | 3                  | 1                                  |
| MVME327A # 2   | FFFAA700                         | 3                  | 1                                  |
| MVME328 # 1    | FFFF9000                         | ?                  | 3                                  |
| MVME328 # 2    | FFFF9800                         | ?                  | 3                                  |
| MVME330A       | FFDC0000                         | 4                  | 1                                  |
| MVME330B       | FFDE0000                         | 4                  | 3                                  |
| MVME332 # 1    | FFFF6000                         | 2                  | 2                                  |
| MVME332 # 2    | FFFF6100                         | 2                  | 2                                  |
| MVME332 # 3    | FFFF6200                         | 2                  | 2                                  |
| MVME332 # 4    | FFFF6300                         | 2                  | 2                                  |
| MVME332XT # 1  | FF780000                         | 4                  | 2                                  |
| MVME332XT # 2  | FF790000                         | 4                  | 2                                  |
| MVME332XT # 3  | FF7A0000                         | 4                  | 2                                  |
| MVME332XT # 4  | FF7B0000                         | 4                  | 2                                  |
| MVME332XT # 5  | FF7C0000                         | 4                  | 2                                  |
| MVME332XT # 6  | FF7D0000                         | 4                  | 2                                  |
| MVME332XT # 7  | FF7E0000                         | 4                  | 2                                  |
| MVME332XT # 8  | FF7F0000                         | 4                  | 2                                  |
| MVME333-2 # 1  | FFFF3800                         | 2                  | 0                                  |
| MVME333-2 # 2  | FFFF3900                         | 2                  | 0                                  |
| MVME333-2 # 3  | FFFF3A00                         | 2                  | 0                                  |
| MVME333X25 # 1 | FFFF4700                         | 2                  | 0                                  |
| MVME333X25 # 2 | FFFF4600                         | 2                  | 0                                  |
| MVME333X25 # 3 | FFFF4500                         | 2                  | 0                                  |
| MVME333X25 # 4 | FFFF4400                         | 2                  | 0                                  |
| MVME333X25 # 5 | FFFF4300                         | 2                  | 0                                  |
| MVME333X25 # 6 | FFFF4200                         | 2                  | 0                                  |
| MVME335 # 1    | FFFF3600                         | 3                  |                                    |
| MVME335 # 2    | FFFF3700                         | 3                  |                                    |
| MVME336 # 1    | EFFC0000                         | 2                  | 2                                  |
| MVME336 # 2    | EFFD0000                         | 2                  | 2                                  |
| MVME336 # 3    | EF FE0000                        | 2                  | 2                                  |
| MVME336 # 4    | EFF F0000                        | 2                  | 2                                  |
| MVME336 # 5    | F0000000                         | 2                  | 2                                  |
| MVME336 # 6    | F0010000                         | 2                  | 2                                  |

| Module Name | VME<br>Short/Extended<br>Address | Interrupt<br>Level | Bus Request/<br>Bus Grant<br>Level |
|-------------|----------------------------------|--------------------|------------------------------------|
| MVME338 # 1 | EFF7C000                         | 2                  | 3                                  |
| MVME338 # 2 | EFF78000                         | 2                  | 3                                  |
| MVME338 # 3 | EFF74000                         | 2                  | 3                                  |
| MVME338 # 4 | EFF70000                         | 2                  | 3                                  |
| MVME350 # 1 | FFFF5000                         | 3                  | 2                                  |
| MVME350 # 2 | FFFF5100                         | 3                  | 2                                  |
| MVME355     | FFFF0800                         | 3                  | 1                                  |
| MVME374 # 1 | FF000000                         | 5                  | 3                                  |
| MVME374 # 2 | FF100000                         | 5                  | 3                                  |
| MVME374 # 3 | FF200000                         | 5                  | 3                                  |
| MVME374 # 4 | FF300000                         | 5                  | 3                                  |
| MVME374 # 5 | FF400000                         | 5                  | 3                                  |
| MVME374 # 6 | FF500000                         | 5                  | 3                                  |





|                |             |                                   |             |
|----------------|-------------|-----------------------------------|-------------|
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## 5.1 Processor modules

| Name             | Service Number | Factory Number                            | Description                     |
|------------------|----------------|-------------------------------------------|---------------------------------|
| MVME131DOF       | 5322 216 22542 | 01-W3370B16                               | Processor MVME131DOF            |
| MVME131XT        | 5322 216 22146 | 01-W1335B03                               | Processor MVME131XT             |
| MVME132DOF       | 5322 216 22375 | 01-W3370B14                               | Processor MVME132DOF            |
| MVME132XT        | 5322 216 61466 | 01-W3370B14                               | Processor MVME132XT             |
| MVME707A         | 5322 216 22152 | 01-W3453B01                               | Transition module MVME131/132   |
| MVME134          | 5322 216 22645 | 01-W3471B02<br>01-W3471B04                | Processor MVME134P              |
| MVME716          | 5322 216 22646 | 01-W3524B01                               | Transition module MVME134       |
| MVME141-1        | 5322 216 22803 | 01-W3528B01                               | Processor MVME141-1 (25Mhz)     |
| MVME141-2        | 5322 216 22884 | 01-W3528B02                               | Processor MVME141-2 (33Mhz)     |
| MVME141-3        | 5322 216 23318 | 01-W3623B03                               | Processor MVME141-3 (50Mhz)     |
| MVME714M         | 5322 216 22849 | 01-W3540B01                               | Transition module MVME141       |
| MVME147          | 5322 216 22783 | 01-W3520B03                               | Processor MVME147 (4Mb) 20MHz   |
| MVME147A         | 5322 216 22784 | 01-W3520B13<br>01-W3520B15                | Proc MVME147A (8Mb) 20 MHz      |
| MVME147A-1       | 5322 216 22956 | 01-W3520B14<br>01-W3520B16<br>01-W3520B17 | Proc MVME147A-1 (8Mb) 25 MHz    |
| MVME147-1        | 5322 216 22957 | 01-W3520B04                               | Proc MVME147-1 (4Mb) 25 MHz     |
| P2 adapter board | 5322 216 22785 | 01-W3496B01                               | P2 adapter board                |
| P2 adapter board | 5322 216 23326 | 01-W3570B01                               | P2 Adapter P9050 (Enhanced)     |
| Fuse             | 5322 253 14018 | 65NW9622A26                               | Fuse MVME147 (SCSI Ethernet)    |
| SCSI terminator  | 4822 116 90531 | 51NW9626A60                               | SCSI term. resistors P2 adapter |
| MVME147S-1       | 5322 216 23293 | 01-W3577B02                               | Proc MVME147S-1 (4Mb) 25 MHz    |
| MVME147SA-1      | 5322 216 23294 | 01-W3577B12                               | Proc MVME147SA-1 (8Mb) 25 MHz   |
| MVME147SB-1      | 5322 216 23454 | 01-W3648B42                               | Proc MVME147SB-1 (16Mb) 25 MHz  |
| MVME147SC-1      | 5322 216 23566 | 01-W3648B52                               | Proc MVME147SC-1 (32Mb) 25 MHz  |
| MVME147SRF       | 5322 216 23323 | 01-W3577B21                               | Proc MVME147SRF (4Mb) 16 MHz    |
| MVME712A         | 5322 216 23134 | 01-W3587B01                               | Transition module MVME147       |
| MVME712AM        | 5322 216 22722 | 01-W3538B01                               | Trans. mod. and modem MVME147   |
| MVME712B         | 5322 216 23135 | 01-W2292C02                               | SCSI and Ethernet MVME147       |
| MVME712C         | 5322 216 23768 | 01-W2006D01                               | SCSI and Eth. Transc. MVME147   |

| Name                 | Service Number | Factory Number | Description                      |
|----------------------|----------------|----------------|----------------------------------|
| MVME187B *           | 0000 187 10016 | 01-W3689B03    | MVME187 RISC Proc Mod (16Mb)     |
| MVME187C *           | 0000 187 10032 | 01-W3689B04    | MVME187 RISC Proc Mod (32Mb)     |
| MVME712A             | 5322 216 23134 | 01-W3587B01    | Transition module MVME187        |
| MVME712AM            | 5322 216 22722 | 01-W3538B01    | Trans. mod. and modem            |
| MVME712B             | 5322 216 23135 | 01-W2292C02    | SCSI and Ethernet MVME187        |
| MVME712C             | 5322 216 23768 | 01-W2006D01    | SCSI and Eth. Transc. MVME187    |
| MVME188SP-5-16 *     | 0000 188 15016 | 01-W2306C12    | Single RISC Proc Module, 3 slots |
| MVME188SP-5-32 *     | 0000 188 15032 |                | Single RISC Proc Module, 4 slots |
| MVME188SP-5-64 *     | 0000 188 15064 | 01-W2306C35    | Single RISC Proc Module, 3 slots |
| MVME188SP-5-128 *    | 0000 188 15128 |                | Single RISC Proc Module, 4 slots |
| MVME188SP-5-192 *    | 0000 188 15192 |                | Single RISC Proc Module, 5 slots |
| MVME188SP-5-256 *    | 0000 188 15256 |                | Single RISC Proc Module, 6 slots |
| MVME188DP-2-16 *     | 0000 188 22016 | 01-W2306C22    | Dual RISC Proc Module, 3 slots   |
| MVME188DP-2-32 *     | 0000 188 22032 | 01-W2306C23    | Dual RISC Proc Module, 4 slots   |
| MVME188DP-2-64 *     | 0000 188 22064 | 01-W2306C24    | Dual RISC Proc Module, 3 slots   |
| MVME188DP-2-128 *    | 0000 188 22128 | 01-W2306C25    | Dual RISC Proc Module, 4 slots   |
| MVME188DP-2-192 *    | 0000 188 22192 |                | Dual RISC Proc Module, 5 slots   |
| MVME188DP-2-256 *    | 0000 188 22256 | 01-W2306C26    | Dual RISC Proc Module, 6 slots   |
| MVME188DP-5-32 *     | 0000 188 25032 | 01-W2306C16    | Dual RISC Proc Module, 4 slots   |
| MVME188QP-2-64 *     | 0000 188 42064 | 01-W2306C27    | Quad RISC Proc Module, 3 slots   |
| MVME188QP-2-128 *    | 0000 188 42128 | 01-W2306C28    | Quad RISC Proc Module, 4 slots   |
| MVME188QP-2-192 *    | 0000 188 42192 |                | Quad RISC Proc Module, 5 slots   |
| MVME188QP-2-256 *    | 0000 188 42256 | 01-W2306C29    | Quad RISC Proc Module, 6 slots   |
| MVME188A-1P128-16 *  | 0001 188 10016 |                | Single RISC Proc Module, 3 slots |
| MVME188A-1P128-32 *  | 0001 188 10032 |                | Single RISC Proc Module, 4 slots |
| MVME188A-1P128-64 *  | 0001 188 10064 |                | Single RISC Proc Module, 3 slots |
| MVME188A-1P128-128 * | 0001 188 10128 |                | Single RISC Proc Module, 4 slots |
| MVME188A-1P128-192 * | 0001 188 10128 |                | Single RISC Proc Module, 5 slots |
| MVME188A-1P128-256 * | 0001 188 10256 |                | Single RISC Proc Module, 6 slots |



| Name                 | Service Number | Factory Number | Description                    |
|----------------------|----------------|----------------|--------------------------------|
| MVME188A-2P128-16 *  | 0001 188 20016 |                | Dual RISC Proc Module, 3 slots |
| MVME188A-2P128-32 *  | 0001 188 20032 |                | Dual RISC Proc Module, 4 slots |
| MVME188A-2P128-64 *  | 0001 188 20064 |                | Dual RISC Proc Module, 3 slots |
| MVME188A-2P128-128 * | 0001 188 20128 |                | Dual RISC Proc Module, 4 slots |
| MVME188A-2P128-192 * | 0001 188 20128 |                | Dual RISC Proc Module, 5 slots |
| MVME188A-2P128-256 * | 0001 188 20256 |                | Dual RISC Proc Module, 6 slots |
| MVME714M             | 5322 216 22849 | 01-W3540B01    | Transition module MVME188 (A)  |

\* The Service Numbers for the RISC processor modules are **not** service numbers, they do not exist as a spare part number. Use these numbers for reporting only.

## 5.2 Memory modules

| Name       | Service Number | Factory Number             | Description              |
|------------|----------------|----------------------------|--------------------------|
| MVME204-2  | 5322 216 22154 | 01-W3541B02                | Mem Module 2Mb with VSB  |
| MVME204-2F | 5322 216 61465 | 01-W3457B01                | Mem Module 2Mb with VSB  |
| MVME205    | 5322 216 22158 | 01-W3541B02                | Mem Module 2Mb with ECC  |
| MVME224-2  | 5322 216 22782 | 01-W3500B02<br>01-W3500B03 | Mem Module 8Mb with VSB  |
| MVME224A-2 | 5322 216 23452 | 01-W3588B02                | Mem Module 8Mb with VSB  |
| MVME224A-3 | 5322 216 23451 | 01-W3588B03                | Mem Module 16Mb with VSB |
| MVME224A-4 | 5322 216 23604 | 01-W3588B04                | Mem Module 32Mb with VSB |

### 5.3 Disk controllers

| Name              | Service Number | Factory Number | Description                 |
|-------------------|----------------|----------------|-----------------------------|
| MVME320A          | 5322 216 22147 | 01-W3429B03    | Disk controller             |
| MVME320B          | 5322 216 22435 | 01-W3483B01    | Disk controller             |
| MVME323-1         | 5322 216 61467 | 01-W2944B02    | ESDI disk controller        |
| MVME323-2         | 5322 216 22857 | 01-W2944B03    | ESDI disk controller        |
| MVME327A          | 5322 216 22848 | 01-W3550B01    | SCSI controller             |
| MVME327AP2        | 5322 216 23121 | 01-W3544B01    | P2 adapter board MVME327A   |
| MVME717           | 5322 216 22847 | 01-W3543B01    | External SCSI connector     |
| SCSI term MVME717 | 4822 116 90531 | 51NW9626A60    | Terminator resistor MVME117 |
| Fuse SCSI bus     | 5322 253 20162 | 51NW9626A60    | Fuse 1A SCSI bus MVME117    |
| MVME328-1         | 5322 216 23593 | 01-W2625C01    | Single SCSI controller      |
| MVME328-2         | 5322 216 23594 | 01-W2625C02    | Dual SCSI controller        |

### 5.4 Tape controllers

| Name    | Service Number | Factory Number             | Description               |
|---------|----------------|----------------------------|---------------------------|
| MVME350 | 5322 216 22148 | 01-W3362B01<br>01-W3362B02 | Streamer controller QIC 2 |
| MVME355 | 5322 216 22149 | 01-W2852B03                | 9-track tape controller   |

## 5.5 DC/LAN controllers

| Name           | Service Number | Factory Number                            | Description                          |
|----------------|----------------|-------------------------------------------|--------------------------------------|
| MVME330A       | 5322 216 22155 | 01-W2821B01                               | PCB Ethernet Office LAN              |
| MVME330B       | 5322 216 22155 | 01-W3321B03                               | PCB Ethernet NSE T CP IP             |
| MVME330 fuse   | 5322 253 20162 | 308101-00                                 | Fuse 1A MVME330                      |
| MVME332        | 5322 216 22153 | 01-C3011A01<br>01-W3504B01                | PCB Serial I O MVME332               |
| MVME332XT      | 5322 216 22643 | 01-W3475B01                               | 8-Serial 1-parallel I O controller   |
| MVME710        | 5322 216 22151 | 01-W3451B01                               | Transition module MVME332 332XT      |
| MVME333-2      | 5322 216 22159 | 01-C3012A01<br>01-W3503B05                | Intelligent communication controller |
| MVME333X.25    | 5322 216 22159 | 01-W3503B06                               | Intell. X25 comm. nontr.             |
| MVME705A       | 5322 216 22157 | 01-C3013A01<br>01-W3505B01                | Trans. module MVME333 6 channels     |
| MVME705B       | 5322 216 22889 | 01-W3505B02                               | Trans. module MVME333 3 channels     |
| MVME335        | 5322 216 22436 | 01-C3014A01<br>01-G3042M02<br>01-W3530B02 | 4-Serial 1-parallel I O controller   |
| MVME715        | 5322 216 22437 | 01-W3497B02                               | Transition module MVME335            |
| MVME336        | 5322 216 22636 | 01-W3487B01                               | MVME336 Delta Link controller        |
| MVME751        | 5322 216 22637 | 01-W3484B01                               | Trans. module MVME336                |
| MVME336 Server | 5322 216 22635 | 01-W3491B01                               | PCB MVME336Delta Link server         |
| PSU server     | 5322 218 80463 | 01-W2393B03                               | Power supply MVME336 Server          |
| Fan server     | 5322 361 21132 | 59NW9807A57                               | FAN 12V 3" MVME336 Server            |
| MVME338        | 5322 693 22922 | HPS6245<br>01-W2840C01                    | Terminal I O Subsystem Controller    |
| MVME338S8P     | 5322 218 80885 | HPS7082-030<br>01-W2023D01                | Terminal server, 8serial, 1 parallel |
| MVME338S16     | 5322 218 80886 | HPS7088-030<br>01-W2023D02                | Terminal server, 16 serial           |
| MVME338R0      | 5322 218 80882 | HPS5580<br>01NW9804D81                    | Repeater, 6 BNC plugs                |
| MVME338R1      | 5322 218 80883 | HPS5581<br>01NW9804D80                    | Repeater, 6 BNC. 1 fibre optic       |
| MVME338R2      | 5322 218 80884 | HPS5582<br>01NW9804D79                    | Repeater, 6 BNC. 2 fibre optic       |
| MVME374        | 5322 216 22861 | 01-W3517B01                               | Int. Ethernet LAN controller         |
| Fuse MVME374   | 5322 253 14018 | 65NW9622A26                               | Fuse MVME374                         |

Mot. P/N:

12-NC:

**NOTE 1:**

|          |        |                |      |     |       |
|----------|--------|----------------|------|-----|-------|
| MVME330A | PROM A | 51AW 4978B05   | 8122 | 189 | 11001 |
|          | PROM B | 51AW 4978B06   | 8122 | 189 | 11011 |
| MVME330B | PROM H | KNL ROM10 R4.1 | 8122 | 189 | 11031 |
|          | PROM L | KNL ROM10 R4.1 | 8122 | 189 | 11021 |

**NOTE 2:**

|            |                     |              |      |     |       |
|------------|---------------------|--------------|------|-----|-------|
| MVME333X25 | X.25 F/W, rev. 2.0, |              |      |     |       |
|            | odd (U82)           | 51--W5048B11 | 8122 | 189 | 12042 |
|            | even (U68)          | 51--W5048B12 | 8122 | 189 | 12032 |

|           |                          |             |      |     |       |
|-----------|--------------------------|-------------|------|-----|-------|
| MVME333-2 | PROM333-2 F/W, rel. 1.1, |             |      |     |       |
|           | odd (U82)                | 51AW4815B39 | 8122 | 189 | 12491 |
|           | even (U68)               | 51AW4815B40 | 8122 | 189 | 12501 |

**5.6 Flexible disk drives**

| Name                  | Service Number | Factory Number                                                              | Description                                                    |
|-----------------------|----------------|-----------------------------------------------------------------------------|----------------------------------------------------------------|
| MVME831               | 5322 693 21834 | FD-55FV<br>01-W0308B03                                                      | 655Kbyte FDD (first one)                                       |
| MVME831XT             | 5322 693 21959 | FD-55GFR-541<br>FD-55GFR-606<br>FD-55GFV-17-U<br>01-W0316B01<br>01-W0316B02 | 1.2Mbyte FDD (first one)                                       |
| Term. Res             |                | RAD-4E-3318 J                                                               | MVME831XT Term. Res.                                           |
| MVME832               | 5322 693 21834 | FD-55FV<br>01-W0308B03                                                      | 655Kbyte FDD (second one)                                      |
| MVME832XT             | 5322 693 21959 | See 831XT                                                                   | 1.2Mbyte FDD (second one)                                      |
| Terminating resistors |                | RAD-4E-3318 J                                                               | MVME831XT-832XT Terminating resistors. 8 x 330 Ohm 16 pins DIP |
| MVME881               | 5322 693 21959 | 01-W0316B02                                                                 | 1.2Mbyte SCSI FDD without OMTI                                 |
| OMTI7000              | 5322 216 22898 | 01-W2091C01                                                                 | OMTI SCSI adapter                                              |
| Terminating resistors | 4822 116 90531 | 8X-4-22-221/331                                                             | MVME881 Terminating resistors. 8 x 220/330 Ohm 16 pins SIP     |
| MVME881A              | 5322 693 23108 | FD-55GS-751-U<br>01-W2484C01                                                | 1.2Mbyte SCSI FDD 5.25"                                        |
| MVME883               | 5322 693 21959 | 01-W0316B02                                                                 | 1.2Mbyte FDD 5.25"                                             |
| Terminating resistors |                | RAD-4E-3318 J                                                               | MVME881 Terminating resistors. 8 x 330 Ohm 16 pins DIP         |
| MVME884               | 5322 693 22727 | 01-W2273C01                                                                 | 1.2 - 4Mbyte FDD 3.5"                                          |



## 5.7 Disk drives

| Name                | Service Number | Factory Number                 | Description                                              |
|---------------------|----------------|--------------------------------|----------------------------------------------------------|
| MVME841             | 5322 693 21913 | Micropolis 1325<br>01-W0306B09 | 67Mbyte disk drive Micropolis                            |
| Terminator resistor | 5322 116 90328 | CTS8625 770<br>105             | MVME841 Terminating resistors<br>220/330 Ohm 10 pins DIP |
| MVME842             | 5322 693 21949 | 94166-182<br>01-W2873B01       | WREN III ESDI 160Mbyte                                   |
| Terminator resistor | 5322 116 90355 | 14-2-151                       | MVME842 Terminating resistors<br>151 Ohm 14 pins DIP     |
| MVME843             | 5322 693 22469 | 941486-442<br>01-W0306B09      | WREN V ESDI 390Mbyte                                     |
| Terminator resistor |                | 12-0X2-151                     | MVME843 Terminating resistors<br>151 Ohm 12 pins SIP     |
| MVME862             | 5322 693 22519 | 01-W2095C01                    | Seagate SCSI 48Mbyte 3.5"                                |
| Terminator resistor | 4822 116 90531 | 8X-4-22-221/331                | MVME862 Terminating resistors<br>220 330 Ohm 8 pins SIP  |
| MVME863             | 5322 693 22723 | 94351-126<br>01-W2314C01       | SWIFT SCSI 104Mbyte 3.5"                                 |
| Term resistor       | 4822 116 90531 | 8X-4-22-221/331                | MVME863 864 Terminating resistors                        |
| MVME863A            | 5322 693 23042 | M2613ESA<br>01-W2801C01        | Fujitsu SCSI 104Mbyte 3.5"                               |
| MVME864             | 5322 693 22724 | 94351-200S<br>01-W2314C02      | SWIFT SCSI 172Mbyte 3.5"                                 |
| MVME864A            | 5322 693 23042 | M2613ESA<br>01-W2801C02        | Fujitsu SCSI 172Mbyte 3.5"                               |
| MVME865             | 5322 693 23105 | M2622SA<br>01-W2006D02         | Fujitsu SCSI 330Mbyte 3.5"                               |
| MVME866             | 5322 693 23106 | M2624SA<br>01-W2006D01         | Fujitsu SCSI 520Mbyte 3.5"                               |
| MVME872             | 5322 693 22519 | Seagate ST517N<br>01-W2095C01  | 48Mbyte SCSI disk 5.25"                                  |
| MVME873             | 5322 693 22173 | Seagate ST296N<br>01-W2096C01  | 85Mbyte SCSI disk 5.25"                                  |
| Term resistor       | 4822 116 90531 | 8X-4-22-221/331                | MVME873/874 Terminating resistors                        |
| MVME874             | 5322 693 21992 | 94161-160<br>01-W2097C01       | WREN III 160Mbyte SCSI disk 5.25"                        |
| Term resistor       | 5322 116 90475 | 8X-4-22-221/331                | MVME875 Terminating resistors<br>220/330 Ohm 20 pins DIP |
| MVME876             | 5322 693 22468 | 94181-702<br>01-W2097C01       | WREN V 702Mbyte SCSI disk 5.25"                          |
| MVME877             | 5322 693 22845 | 94601-12G<br>01-W2496C01       | WREN VII 1000Mbyte SCSI disk 5.25"                       |

| Name          | Service Number | Factory Number           | Description                                              |
|---------------|----------------|--------------------------|----------------------------------------------------------|
| MVME875       | 5322 693 22094 | 94171-300<br>01-W2097C01 | WREN IV 300Mbyte SCSI disk 5.25"                         |
| Term resistor | 5322 116 90475 | 8X-4-22-221/331          | MVME875 Terminating resistors<br>220/330 Ohm 20 pins DIP |
| MVME876       | 5322 693 22468 | 94181-702<br>01-W2097C01 | WREN V 702Mbyte SCSI disk 5.25"                          |
| Term resistor | 4822 116 90531 | 8X-4-22-221/331          | MVME876 Terminating resistors                            |
| MVME877       | 5322 693 22845 | 94601-12G<br>01-W2496C01 | WREN VII 1000Mbyte SCSI disk 5.25"                       |

## 5.8 Tape drives

| Name          | Service Number | Factory Number           | Description                                              |
|---------------|----------------|--------------------------|----------------------------------------------------------|
| MVME851       | 5322 693 21519 | 5945C<br>01-W2597B04     | Archive streamer QIC2                                    |
| MVME853       | 5322 693 21996 | 2150S<br>01-W2013C01     | VIPER 120/150Mbyte SCSI streamer                         |
| MVME853Q      | 5322 693 22172 | 2150L<br>01-W2168C01     | VIPER 120/150Mbyte QIC2 streamer                         |
| MVME855       | 5322 693 22722 | 01-W2275C01              | TEAC 155Mbyte SCSI streamer 3.5"                         |
| Term resistor |                | 11W221 J331<br>JBD89     | MVME855 Terminating resistors                            |
| MVME856       | 5322 693 22621 | 01-W2272C01<br>EXB-8200S | EXAbyte 2Gbyte SCSI streamer                             |
| Term resistor | 5322 116 90475 | 8X-4-22-221/331          | MVME856 Terminating resistors<br>220/330 Ohm 20 pins DIP |

## 5.9 Cabinets

### 5.9.1 P9030/P9035 cabinet

| Name          | Service Number | Factory Number | Description               |
|---------------|----------------|----------------|---------------------------|
| Backplane     | 5322 216 23324 | 01-W2293C01    | Backplane P9030 and P9035 |
| Power supply  | 5322 218 80771 | 01-W2209C01    | Auto ranging power supply |
| Air filter    | 5322 480 40221 | 35-W6032B01    | Air filter                |
| On/Off switch | 5322 276 12898 | 30-W2405C01    | On/Off switch with cable  |

### 5.9.2 P9050/P9045 cabinet

| Name          | Service Number | Factory Number | Description                                     |
|---------------|----------------|----------------|-------------------------------------------------|
| Backplane     | 5322 216 22543 | 01-W2961B03    | Backplane old P9050                             |
| Backplane     | 5322 466 92848 | 01-W2371C01    | Backplane P9050/9045 (Enhanced)                 |
| Power supply  | 5322 218 80428 | 01-W2717B03    | Power supply old P9050                          |
| Power supply  | 5322 218 80772 | 01-W2196C01    | Auto ranging power supply P9050/9045 (Enhanced) |
| Fan12V 3"     | 5322 361 10488 | 96010915       | Fan 12V 3" PSU old P9050                        |
| Fan12V 4"     | 5322 361 10501 | 59NW9807A58    | Fan 12V 4" rack old P9050                       |
| Fan12         | 5322 361 21088 | 59NW9807A61    | Fan 12 P9050/P9045 (Enhanced)                   |
| On/Off switch | 5322 277 11045 | 96010914       | On/Off switch old P9050                         |

### 5.9.3 P9070 cabinet

| Name               | Service Number | Factory Number | Description                                 |
|--------------------|----------------|----------------|---------------------------------------------|
| Backplane          | 5322 216 22156 | 01-W2789B01    | Backplane P9070                             |
| Power supply       | 5322 218 80316 | XL450-4407     | Power supply P9070 450Watt                  |
| Power supply       | 5322 218 80909 | 01-W2412C01    | 750Watt input selectable power supply P9070 |
| AC line filter     | 5322 121 42977 | 96010810       | AC power line filter P9070                  |
| Air filter         | 5322 480 50364 | 96010906       | Air filter P9070                            |
| Fan                | 5322 361 10449 | 96010799       | Fan DC P9070                                |
| On/Off switch 220V | 5322 276 12197 | 96010914       | On/Off switch P9070                         |
| Reset switch       | 5322 276 12198 | 96010837       | Reset switch P9070 with cable               |

### 5.9.4 P9090 cabinet

| Name           | Service Number | Factory Number | Description                |
|----------------|----------------|----------------|----------------------------|
| Backplane      | 5322 216 22886 | 01NW9804D48    | Backplane P9090            |
| Power supply   | 5322 218 80561 | 01-W2089C03    | Power supply P9090         |
| AC line filter | 5322 121 43252 | 91NW9705A21    | AC power line filter P9090 |
| On/Off switch  | 5322 273 20315 | 40NW9801B87    | On/Off switch P9090        |
| Reset switch   | 5322 276 12556 | 40NW9801B85    | Reset switch P9090         |
| Operator panel | 5322 216 22885 | 40NW9801B85    | Operator panel P9090       |



## 5.10 Terminals

### 5.10.1 FT45

| Name               | Service Number | Factory Number | Description                   |
|--------------------|----------------|----------------|-------------------------------|
| PCB Kb             | 5322 216 61457 | 81493051       | PCB Kb 55xx W/O Keytops       |
| PCB MPU            | 5322 216 22173 | 81502012       | PCB MPU Processor             |
| PCB RS232          | 5322 216 22174 | 81502042       | PCB RS232 Interface           |
| PCB Power Supply   | 5322 216 22177 | 81502072       | PCB Power Supply              |
| PCB CRT Monitor    | 5322 216 22178 | 81502111       | PCB CRT Monitor               |
| CRT with Yoke      | 5322 131 20206 | 81502051       | CRT with Yoke Amber Colour    |
| CRT with Yoke      | 5322 131 20207 | 81502061       | CRT with Yoke Green Colour    |
| Brightness Control | 5322 218 80328 | 90141062       | Brightness Control with Cable |
| Fuse 1.6A 250V     | 4822 253 30024 | 28200640       | Fuse 1.6A 250V Slow           |
| Keyboard Cable     | 5322 321 22522 | 82040052       | Keyboard Cable                |
| Filter             | 5322 121 43017 | 29200190       | Filter Line 4A 250V           |

### 5.10.2 TM220

| Name               | Service Number | Factory Number | Description                   |
|--------------------|----------------|----------------|-------------------------------|
| PCB Keyboard       | 5322 216 22356 | 3515480        | PCB Keyboard                  |
| PCB Controller     | 5322 216 22355 | 3515440-01     | PCB Controller                |
| PCB Power Supply   | 5322 218 80366 | 3513403-01     | PCB Power Supply              |
| PCB Video          | 5322 216 22354 | 3515240-01     | PCB Video (old type)          |
| VDU-Controller     | 5322 216 23572 | 3522140-01     | VDU-Controller                |
| Adapter            | 5322 321 61136 | 3515505-03     | Adapter                       |
| Yoke with Cable    | 5322 150 10244 | 3515158-01     | Yoke with Cable               |
| Brightness Control | 5322 218 80367 | 3515233-01     | Brightness Control with Cable |
| CRT Green          | 5322 131 20229 | 3515157-02     | CRT Green                     |
| CRT Amber          | 5322 131 20231 | 3515157-03     | CRT Amber                     |
| Switch On/Off      | 5322 277 11029 | 3515385-01     | Switch On/Off and Filter      |
| Fuse 1A 220V       | 4822 253 30021 | 070-467        | Fuse 1A 220V Slow             |
| Fuse 2A 115V       | 5322 253 54033 | 070-312        | Fuse 2A 115V Slow             |
| CAP Fuse Holder    | 5322 462 41207 | 070-413        | CAP Fuse Holder               |

### 5.10.3 Microvitec M4305

| Name              | Service Number | Factory Number | Description                     |
|-------------------|----------------|----------------|---------------------------------|
| Power Supply Assy | 5322 218 80707 | A02038I01      | Power Supply Assy               |
| Tube Base Assy    | 5322 216 23163 | A02529I01      | Tube Base Assy                  |
| Power Supply Assy | 5322 218 80708 | A03820I01      | Power Supply Assy for Interface |
| Interface Assy    | 5322 216 23164 | A04191I01      | Interface Assy                  |
| CRT               | 5322 131 20293 | VC0068NC1      | CRT                             |

### 5.10.4 P2701 (C-ITOH 324)

| Name               | Service Number | Factory Number | Description             |
|--------------------|----------------|----------------|-------------------------|
| PCB Main Logic     | 5322 216 23223 | 39B00993       | PCB Main Logic          |
| PCB Monitor        | 5322 216 23222 | 39B00992       | PCB Monitor             |
| Power Supply       | 5322 218 80733 | 3128E00337     | Power Supply            |
| CRT Assy           | 5322 131 20298 | 38B00018       | CRT Assy (Amber)        |
| CRT Assy           | 5322 131 20299 | 38B00019       | CRT Assy (Green)        |
| CRT Assy           | 5322 131 20301 | 38B00020       | CRT Assy (White)        |
| Front Bezel        | 5322 451 21039 | 21B00040       | Front Bezel             |
| VR Knob            | 5322 413 31593 | 5P00427        | VR Knob (Brightness)    |
| VR Knob            | 5322 413 31594 | 5P00428        | VR Knob (Contrast)      |
| Modular Jack Assy  | 5322 216 23226 | 41B00293       | Modular Jack Assy       |
| Logic Card Spacer  | 5322 532 61157 | 4159T01012     | Logic Card Spacer       |
| Power Switch       | 5322 276 12701 | 4235P00420     | Power Switch ESB70707V  |
| Line Filter        | 5322 121 43406 | 8075P00085     | Line Filter LF203 ESI   |
| Fuse ES3           | 4822 070 11002 | 4215P00042     | Fuse ES3 - 1000 T1.0A   |
| PCB Keyboard       | 5322 216 23221 | 39B00580       | PCB Logic Keyboard      |
| Speaker 8 $\Omega$ | 5322 240 30533 | 51B00086       | Speaker 8 $\Omega$ 5cm. |
| Spring Stand       | 5322 462 41531 | 3151T00847     | Spring Stand            |
| Stand              | 5322 462 41529 | 3151T00846     | Stand                   |
| Foot               | 5322 462 41532 | 4151T00862     | Foot                    |
| Modular Cord       | 5322 321 23826 | 4265P00823     | Modular Cord            |

## 5.10.5 P2702 (C-ITOH 324<sup>+</sup>)

| Name              | Service Number | Factory Number      | Description            |
|-------------------|----------------|---------------------|------------------------|
| PCB Main Logic    | 5322 216 23225 | 39B01155            | PCB Main Logic         |
| PCB Monitor       | 5322 216 23224 | 39B01153            | PCB Monitor            |
| Power Supply      | 5322 218 80734 | 39B01154            | Power Supply           |
| CRT Assy          | 5322 131 20301 | 38B00020            | CRT Assy (White)       |
| Front Bezel       | 5322 451 21039 | 21B00040            | Front Bezel            |
| VR Knob           | 5322 413 31593 | 5P00427             | VR Knob (Brightness)   |
| VR Knob           | 5322 413 31594 | 5P00428             | VR Knob (Contrast)     |
| Modular Jack      | 5322 216 23226 | 41B00293            | Modular Jack Assy      |
| Logic Card Spacer | 5322 532 61157 | 4159T01012          | Logic Card Spacer      |
| Power Switch      | 5322 276 12701 | 4235P00420          | Power Switch ESB70707V |
| Line Filter       | 5322 121 43406 | 8075P00085          | Line Filter LF203 ESI  |
| Fuse ES3          | 4822 070 11002 | 239003<br>4215P0042 | Fuse ES3 - 1000 T1.0A  |
| PCB Keyboard      | 5322 216 23221 | 39B0058B            | PCB Logic Keyboard     |
| Speaker Assy      | 5322 240 30533 | 51B00086            | Speaker Assy           |
| Spring Stand      | 5322 462 41531 | 3151T00847          | Spring Stand           |
| Stand             | 5322 462 41529 | 3151T00846          | Stand                  |
| Foot              | 5322 462 41532 | 4151T00862          | Foot                   |
| Modular Cord      | 5322 321 23826 | 4265P00823          | Modular Cord           |

### 5.10.6 P2707 (WYSE 120)

| Name           | Service Number | Factory Number | Description                |
|----------------|----------------|----------------|----------------------------|
| Power Switch   | 5322 276 12886 | 341006-04      | Power Switch               |
| Potmeter       | 5322 101 21097 | 365505-19      | Potential meter Brightness |
| Potmeter       | 5322 101 21098 | 365508-11      | Potential meter Contrast   |
| Yoke           | 5322 140 20073 | 419010-01      | Yoke Assembly              |
| Knob           | 5322 414 60685 | 460019-01      | Knob, Power Switch         |
| Ball Knob      | 5322 414 60686 | 460020-01      | Ball Knob                  |
| Fuse           | 4822 070 32002 | 530013-29      | Fuse 2A 250V               |
| Bezel          | 5322 447 80511 | 710337-03      | Bezel                      |
| CRT            | 5322 131 20318 | 780057-01      | CRT. White                 |
| CRT            | 5322 113 20319 | 780058-01      | CRT. Amber                 |
| LED Assy       | 5322 130 82031 | 840469-01      | LED Assembly               |
| PCB CRT Driver | 5322 216 23287 | 990214-02      | PCB CRT Driver             |





## 8 POWER SUPPLY UNITS

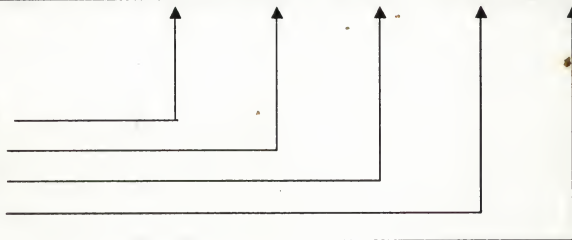
Section:

Page:

|                                                     |       |       |       |       |       |
|-----------------------------------------------------|-------|-------|-------|-------|-------|
| 1: Power Supply P9030/P9035<br>Micro Energy 59-6091 | 8.1-1 | 8.1-2 | 8.1-4 | 8.1-4 | n.a.  |
| 2: Power Supply P9050<br>Todd MDX-403-9145E         | 8.2-1 | 8.2-2 | 8.2-3 | 8.2-4 | 8.2-5 |
| 3: Power Supply P9050/P9045<br>LH-Research CM-E2778 | 8.3-1 | 8.3-2 | 8.3-3 | 8.3-3 | n.a.  |
| 4: Power Supply P9070<br>Boschert XL450-XX07        | 8.4-1 | 8.4-2 | 8.4-3 | 8.4-4 | 8.4-4 |
| 5: Power Supply P9070<br>TODD MAX 753-10430         | 8.5-1 | 8.5-2 | 8.5-2 | 8.5-4 | 8.5-4 |
| 6: Power Supply P9070<br>TODD 700 watts             | 8.6-1 | 8.6-2 | 8.6-2 | 8.6-4 | 8.6-4 |
| 7: Power Supply P9090<br>Boschert XL1000-46XX       | 8.7-1 | 8.7-2 | 8.7-3 | 8.7-4 | 8.7-5 |
| 8: Uninterruptable P.S.                             | 8.8-1 | 8.8-1 | 8.8-1 | 8.8-1 | 8.8-2 |
| 9: P9000-083 UPS 600VA                              | 8.9-1 | 8.9-2 | 8.9-3 | 8.9-4 | 8.9-4 |

Subsection:

- 1 Characteristics
- 2 Connections
- 3 Strap Settings
- 4 Installation
- 5 Maintenance



**NOTE:** n.a. means that this section is not applicable for this unit.



## 8.1 POWER SUPPLY P9030/P9035 Micro Energy 59-6091

### 8.1.1 Characteristics

This power supply is an auto ranging power supply for the voltage range from 100 Vac through 240Vac.

| DC voltage | Current in Amps |     |      |
|------------|-----------------|-----|------|
|            | Min             | Max | Peak |
| + 5        | 2.0             | 20  | --   |
| + 12       | 0.5             | 5   | 8.0  |
| -12        | 0.0             | 1   | 1.5  |

#### Electrical specifications:

|                             |                                                 |
|-----------------------------|-------------------------------------------------|
| AC input range              | : 90 - 132 Vac; 186 - 264 Vac auto ranging      |
| AC input frequency          | : 47 to 63Hz                                    |
| Output                      | : 175 watt's continuous, total from all outputs |
| Holdover storage            | : 16msec from the last peak of the line voltage |
| Isolation voltage           | : 1250 Vac as per IEC 380                       |
| Input to frame              | : 1250 Vac minimum                              |
| Turn-on surge current (max) | : Less than 30A peak (2 cycles max)             |
| Leakage current             | : Less than 20mA RMS at 250Vac 50Hz             |

#### Environmental specifications:

|                     |                                                                                                                                                  |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature         |                                                                                                                                                  |
| Storage             | : -55 to +85 degrees C                                                                                                                           |
| Operating (ambient) | : 0 to 60 degrees C (continuous duty)<br>With linear current derating between +50 to +60 degrees C to 50% of maximum rated output power.         |
| Cooling             | : Meets all specifications with 20cfm forced air cooling directed down the length of the power supply.                                           |
| Shock and vibration | : 25g shock, 11ms duration, 1.2 sine wave in 3 planes.<br>Vibration sine wave 10 to 1000 to 10Hz, 2g 10 min/decade, three planes without damage. |



### 8.1.2 Connection

For physical connector location see next figure.

#### Connector PS1 to backplane connector JS1

|    |          |        |
|----|----------|--------|
| 1  | Red      | + 5V   |
| 2  | Red      | + 5V   |
| 3  | Red      | + 5V   |
| 4  | Black    | Common |
| 5  | Black    | Common |
| 6  | Black    | Common |
| 7  | Black    | Common |
| 8  | Black    | Common |
| 9  | Not used |        |
| 10 | Red      | + 5V   |
| 11 | Red      | + 5V   |
| 12 | Red      | + 5V   |
| 13 | Not used |        |
| 14 | Red      | + 5V   |
| 15 | Orange   | + 12V  |
| 16 | Violet   | -12V   |
| 17 | Black    | Common |
| 18 | Black    | Common |

#### Connector P1; P2; P3 (device power)

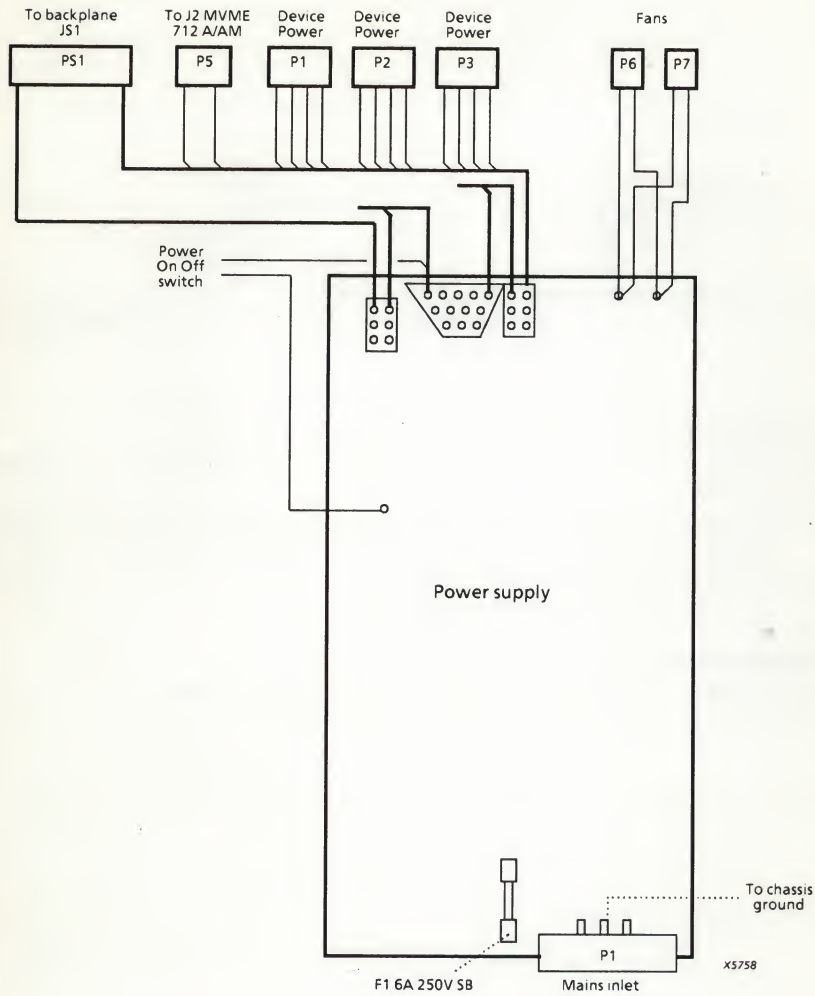
|   |        |        |
|---|--------|--------|
| 1 | Orange | + 12V  |
| 2 | Black  | Common |
| 3 | Black  | Common |
| 4 | Red    | + 5V   |

#### Connector P5 to MVME712A/AM connector J2 (modem power)

|   |          |        |
|---|----------|--------|
| 1 | Red      | + 5V   |
| 2 | Orange   | + 12V  |
| 3 | Violet   | -12V   |
| 4 | Black    | Common |
| 5 | Not used |        |
| 6 | Not used |        |

#### Connector P6; P7 (fans on power supply)

|   |        |        |
|---|--------|--------|
| 1 | Black  | Common |
| 2 | Orange | + 12V  |



### 8.1.3 Strap setting

The Micro Energy power supply is an auto ranging power supply, there are no straps or switches that needs setting or checking.

### 8.1.4 Installation

#### Power supply removal

- Ensure that the power to the cabinet is disconnected.  
**Warning:** *Voltages capable of causing DEATH are present in the cabinet.*
- Remove the front cover, pop it off from the cabinet.
- Remove the top cover by removing the three screws and moving the top cover to the rear.
- Follow the ESD rules.
- Disconnect PS1 from the backplane connector JS1.  
Disconnect the device power plugs P1; P2; P3.
- Remove the three screws holding the power supply housing to the device mounting plate.
- Slide out the power supply housing, take care for damaging of the cable harness.  
The power supply itself is mounted inside the housing. If necessary open the housing to reach the power supply.  
Store the power supply into an anti static bag.

#### Power supply replacement

To replace the power supply, perform the removal procedure in reverse order.

## 8.2 Power Supply P9050 Todd MDX-403-9145E

### 8.2.1 Characteristics

#### Electrical Specifications :

|                                 |   |                                               |
|---------------------------------|---|-----------------------------------------------|
| AC Input Range (VAC)            | : | 90 to 132 Vac<br>180 to 264 Vac               |
| AC Input Frequency              | : | 47 to 63 Hz                                   |
| Output                          | : | 500 watts, total from all outputs             |
| Holdover storage                | : | 16msec from the last peak of the line voltage |
| Isolation Voltage               | : | 264 Vac as per IEC380                         |
| Input to Frame                  | : | 250 Vac                                       |
| Output to Frame                 | : | 250 Vac                                       |
| Turn-On Surge Current (maximum) | : | 35 A peak                                     |
| Leakage Current (maximum)       | : | 2.0 mA                                        |

#### Environmental:

|                     |   |                                                                                                                                                           |
|---------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature         | : |                                                                                                                                                           |
| Storage             | : | -55 to +85 degrees C                                                                                                                                      |
| Operating (ambient) | : | 0 to 70 degrees C (continuous duty). With linear current derating between +50 to +70 degrees C to 60% (50% for MAX models) of maximum rated output power. |
| Cooling             | : | Meets all specifications with 50cfm forced air cooling directed down the length of the power supply.                                                      |
| Shock and Vibration | : | 25g shock, 11ms duration, 1/2 sine wave in 3 planes. Vibration sine 10 to 100 to 10Hz, 2g, 10 min./decade three planes without damage.                    |

#### Todd MDX models Output Ratings

| OUTPUT NUMBER | DC VOLTAGE | RATED CURRENT (AMPS) | LOAD REG.<br>20% to 100%<br>CHANGE                                                  | LINE REG.<br>LOW Vac<br>TO HIGH Vac | CROSS REG.<br>MAX. |
|---------------|------------|----------------------|-------------------------------------------------------------------------------------|-------------------------------------|--------------------|
| 1             | +5.0       | 60.0                 | ± 1.0%                                                                              | 0.2%                                | ± 1.0%             |
| 2             | +12.0      | 10.0                 | Stays within ± 5% for any combination of line, load, cross regulation and centering |                                     |                    |
| 3             | -12.0      | 10.0                 |                                                                                     |                                     |                    |
| 4             | +24.0      | 1.5                  | ± 1.0%                                                                              | 1.0%                                | ± 1.0%             |

**NOTE:** Outputs 1 and 2 are limited to a total of 60 amps.

The supply will operate within the limits specified above with a minimum load current of 5 amps on the 5 volt output.



## 8.2.2 Connections

For physical connector locations see next page.

| CONNECTOR TB1 | FUNCTION   | WIRE COLOUR  |
|---------------|------------|--------------|
| Pin 1         | AC hot     | Brown        |
| Pin 2         | AC neutral | Blue         |
| Pin 3         | Pr. ground | Green/Yellow |

| CONNECTOR TB2 | FUNCTION | WIRE COLOUR |
|---------------|----------|-------------|
| Pin 1         | Not used | - -         |
| Pin 2         | Not used | - -         |
| Pin 3         | Return   | Black       |
| Pin 4         | -12V     | Purple      |
| Pin 5         | + 12V    | Orange      |
| Pin 6         | Return   | Black       |

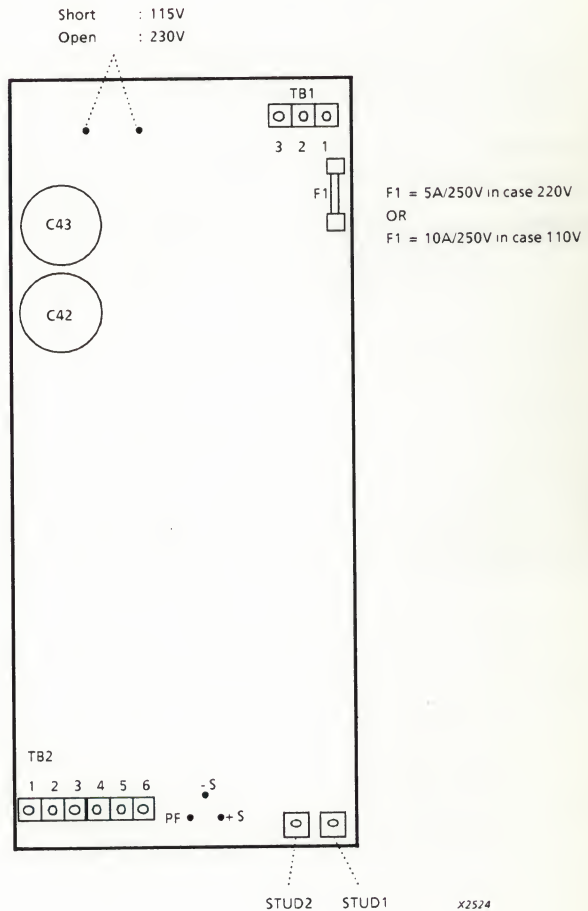
| CONNECTOR | FUNCTION          | WIRE COLOUR |
|-----------|-------------------|-------------|
| + 5       | + 5V sense        | Red/White   |
| -5        | + 5V sense return | Grey/White  |
| PF        | AC-fail signal    | Grey        |

| STUD NO. | FUNCTION    | WIRE COLOUR |
|----------|-------------|-------------|
| Stud 1   | + 5V        | Red         |
| Stud 2   | + 5V return | Black       |

### 8.2.3 Strapsetting

For readjusting the 5Vdc output, see section 8.2.5 (Maintenance).

The mains voltage range strap needs checking and setting for the correct range, see below.



## 8.2.4 Installation

### Removal:

- Disconnect the mains cable.
- Remove cover from P9050, take care for cable damage.
- Follow the ESD rules.
- Remove cover plate from PSU (1 screw)
- Disconnect AC-mains connection.
- Disconnect the secondary voltage wires.
- Disconnect pf, +5 and -5 connections.
- Unscrew the screws and remove PSU.

### Replacement:

- This can be done by following the removal procedure in reverse order.

**CAUTION:** *When installing the PSU check 110/220 Volt strap setting and the value of the fuse: in case 110V → 10A/115V  
in case 220V → 5A/250V*

### 8.2.5 Maintenance

If the output of the system power supply degrades with the original configuration (or a load that has worked satisfactorily for an extended period of time), the power supply should be replaced, since degradation under static load is a precursor to power supply failure.

When subassemblies are added to the system cabinet it may be necessary to readjust the 5Vdc. No other voltages should be adjusted or balance adjustments changed. Use a meter with at least a 5% dc accuracy. The 5Vdc should not be adjusted above 5.10Vdc measured at the backplane.

Adjustment procedure for the power supply of the P9050:

- Powerdown the system in the correct way and switch it off.
- Disconnect the mains cable.
- Remove the cabinet enclosure, take care for cable damage.
- Follow the ESD rules.
- Remove the plate on top of the PSU.
- Connect the leads of the Vdc-meter to the 5V-studs on the backplane, via properly insulated crocodile clips.
- Connect the mains cable, power on and start the system.
- Adjusting the 5Vdc is done with the potmeter R18 or the potmeter R38. This depends on the type of the power supply.  
Power supply 01-W2158C01    R38  
Power supply 01-W2717B03    R18
- R18 or R38 can be reached when the plate on top of the power supply is removed.
- Powerdown the system in the correct way and switch it off.
- Disconnect the mains cable.
- Secure R18 or R38 again with a suitable seal.
- Re-install the plate on top of the power supply and the cabinet enclosure. Take care for cable damage.





## 8.3 Power Supply P9050/P9045 LH-Research CM-E2778/115-230

### 8.3.1 Characteristics

#### Electrical specifications:

AC Voltage : 90 - 132 Vac; 180 - 264 Vac  
 The power supply is an auto ranging power supply it accepts ALL input voltages without changes.

AC Frequency : 47 to 63 Hz

Output : 300 Watts total from all outputs

Holdover storage : 12msec from the last peak of the line voltage

Isolation voltage : 1250 Vac minimum as per IEC 380

Turn-on surge : Less than 40A for 115 Vac, or 80A for 220 Vac

Leakage current : Less than 3.5mA

| OUTPAL NUMBER | DC VOLTAGES | CURRENT IN AMPS | LOADS                            | TOTAL REGULATION     | VOLTAGE RANGE *                              | CENTERED VOLTAGES       |
|---------------|-------------|-----------------|----------------------------------|----------------------|----------------------------------------------|-------------------------|
| 1             | + 5.05 V    | 40.0            | 4.0-40A                          | ± 1%                 | N/A                                          | 5.05<br>± 0.5VAT<br>20A |
| 2             | + 12.1 V    | 6.5 Cnt         | 0-0.5A<br>0.5A-6.5A<br>6.5A-8.0A | ± 7%<br>± 2%<br>± 7% | 11.2 - 13.0V<br>11.8 - 12.4V<br>12.2 - 12.4V | 12.1 ± 0.5V<br>AT 3.5A  |
| 3             | -12.1V      | 1.5             | 0-1.5A                           | ± 2%                 | 11.7 - 12.5V                                 | N/A                     |

\* Total acceptable output voltage range for total regulation and centering.

#### Environmental specifications:

##### Temperature

Storage : -55 to +85 degrees C

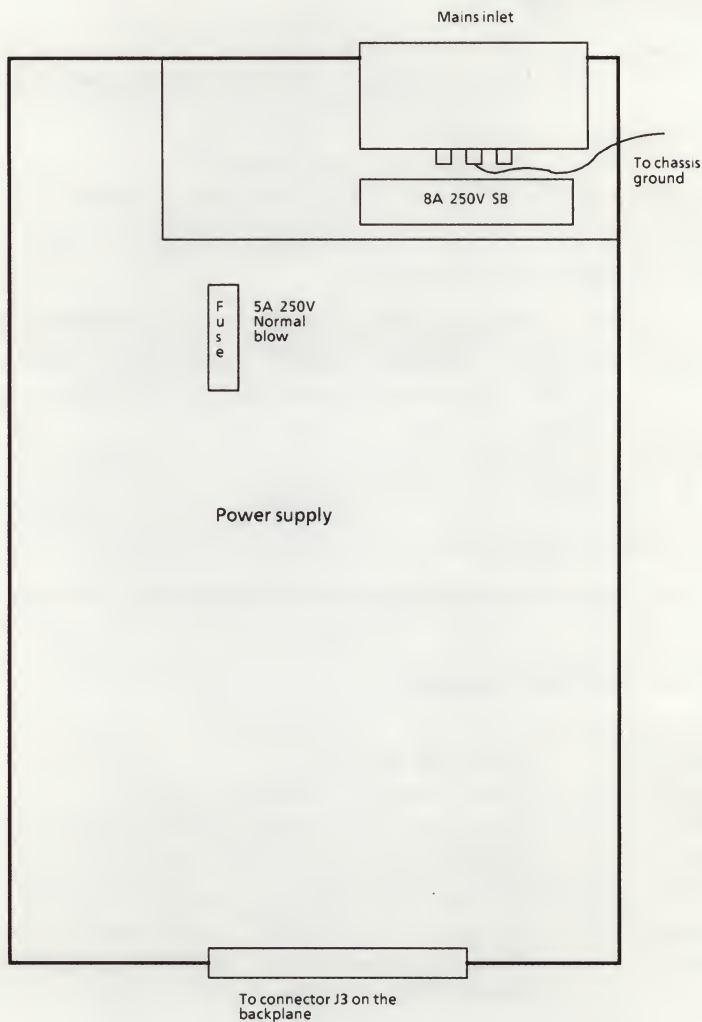
Operating (ambient) : 0 to 60 degrees C (continuous duty)  
 With linear current derating between +50 to +60 degrees C to 50% of maximum rated output power.

Cooling : Meets all specifications with 20cfm forced air cooling directed down the length of the power supply.

Shock and vibration : 25g shock, 11ms duration, 1/2 sine wave in 3 planes.  
 Vibration sine wave 10 to 1000 to 10Hz, 2g 10 min/decade, three planes without damage.

### 8.3.2 Connections

The only connections to make to the power supply are shown in the figure below.



### **8.3.3 Strapsettings**

The LH-Research CM-E2778/1150230 power supply is an auto ranging power supply from 90 Vac through 264 Vac, so no mains inlet strapping required.

### **8.3.4 Installation**

#### **Removal:**

- Powerdown the system.
- Disconnect mains inlet cable from the system.
- At the rear of the system remove the four screws securing the power supply into the chassis.
- Using the power supply handle, remove the power supply by pulling it out the rear of the chassis.

#### **Replacement:**

- This can be done by following the removal procedure in the reverse order.





## 8.4 Power Supply P9070 Boschert XL450-XX07

### 8.4.1 Characteristics

The output power of this power supply is too low for a RISC system.

The Boschert power supply is strap selectable for the mains voltage range, this results in two order numbers :

- Low voltage range (90 - 132 Volt) : XL450-3407
- High voltage range (180 - 264 Volt) : XL450-4407

| DC voltage | Current |     |      |
|------------|---------|-----|------|
|            | Min     | Max | Peak |
| + 5V       | 3A      | 60A | --   |
| + 12V      | 1A      | 15A | 20A  |
| -12V       | 1A      | 10A | 12A  |
| + 24V      | 1A      | 12A | 20A  |
| -24V       | 1A      | 4A  | 6A   |

#### Electrical specifications:

|                               |                                                 |
|-------------------------------|-------------------------------------------------|
| AC input range                | : 90 - 132 Vac; 186 - 264 Vac input selectable  |
| AC input frequency            | : 47 to 63Hz                                    |
| Primary load limit            | : 510 watts min; 665 watts max                  |
| Output                        | : 450 watts continuous, total from all outputs  |
| Reverse polarity protection   | : Yes                                           |
| Holdover storage              | : 32msec from the last peak of the line voltage |
| Turn-on surge current (max)   | : Less than 90A peak (2 cycles max)             |
| Leakage current               | : Less than 0.1mA RMS at 264Vac 50Hz            |
| Safety standards              | : VDE 0806; IEC 380                             |
| Regulation                    | : + 5Vdc is sensed                              |
| Overvoltage protection + 5Vdc | : 6.05Vdc +/-0.55Vdc                            |
| Thermal protection            | : On heatsink, temp 90°C to 110°C               |

## 8.4.2 Connections

For physical connector locations see next page.

| CONNECTOR TB1 | FUNCTION   | WIRE COLOUR  |
|---------------|------------|--------------|
| Pin 1         | AC hot     | Brown        |
| Pin 2         | AC neutral | Blue         |
| Pin 3         | Pr. Ground | Green/Yellow |

| CONNECTOR TB2 | FUNCTION | WIRE COLOUR |
|---------------|----------|-------------|
| Pin 1         | Return   | Black       |
| Pin 2         | Return   | Black       |
| Pin 3         | - 24 V   | Not used.   |
| Pin 4         | + 24 V   | Yellow      |
| Pin 5         | - 12 V   | Orange      |
| Pin 6         | + 12 V   | Blue        |

| CONNECTOR P 1 | FUNCTION           | WIRE COLOUR |
|---------------|--------------------|-------------|
| Pin 1         | + 5 V sense        | Not used.   |
| Pin 2         | + 5 V sense Return | Not used.   |

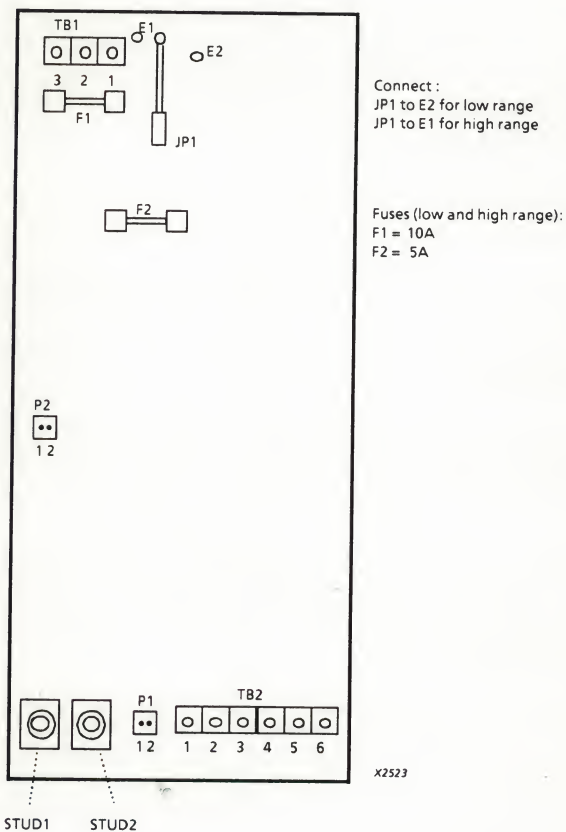
| CONNECTOR P 2 | FUNCTION       | WIRE COLOUR |
|---------------|----------------|-------------|
| Pin 1         | AC-fail signal | Red         |
| Pin 2         | AC-fail Return | Not used.   |

| STUD NO. | FUNCTION     | WIRE COLOUR |
|----------|--------------|-------------|
| Stud 1   | + 5 V        | Red         |
| Stud 2   | + 5 V Return | Black       |

### 8.4.3 Strapsettings

For readjusting the 5Vdc output, see section 8.4.5 (Maintenance).

The mains voltage range strap needs checking and setting for the correct range, see below.





#### 8.4.4. Installation

##### Removal :

- Disconnect the mains cable.
- Remove the cover from the P9070, take care for cable damage.
- Follow the ESD rules.
- Remove the cable from the VME boards which are running in front of the PSU.
- Remove the PSU bracket lock screw, at the right side of the cabinet.
- Lift the PSU up until all 4 camlocks are free and pull the PSU to the front.
- Slide the top of the PSU to the left and disconnect the AC mains connection.
- Slide the PSU completely out ( take care not to damage any cabling ).
- Remove the cover plate from the PSU ( six screws ).
- Disconnect the AC-fail wire from P2.
- Disconnect the secondary voltage wires.
- Exchange the PSU.

##### Replacement :

- This can be done by following the removal procedure in the reverse order.

#### 8.4.5 Maintenance

If the output of the system power supply degrades with the original configuration (or a load that has worked satisfactorily for an extended period of time), the power supply should be replaced, since degradation under static load is a precursor to power supply failure.

When subassemblies are added to the system cabinet it may be necessary to readjust the 5Vdc. No other voltages should be adjusted or balance adjustments changed. Use a meter with at least a 5% dc accuracy. The 5Vdc should not be adjusted above 5.10Vdc measured at the backplane.

Procedure for the power supply of the P9070:

- Powerdown the system in the correct way and switch it off.
- Remove the cabinet enclosure, take care for cable damage.
- Follow the ESD rules.
- Connect the leads of the Vdc-meter to the 5V-studs J28 and J29 on the backplane, via properly insulated crocodile clips.
- Power on the system.
- Adjusting the 5Vdc is done with the potmeter R79.
- R79 can be reached via a hole in the chassis of the PSU (left side, seen from the front panel).
- Powerdown the system in the correct way and switch it off.
- Remove the crocodile clips from the backplane.
- Secure R79 again with a suitable seal.
- Re-install the cabinet enclosure, take care for cable damage.

## 8.5 Power Supply P9070 TODD MAX 753-10430

### 8.5.1 Characteristics

This power supply is an input selectable power supply. It may be used for the P9070 cabinets equipped with CISC and RISC processors.

| DC voltage | Min load current in Amps | Current in Amps    | Loads in Amps     | Total regulation |
|------------|--------------------------|--------------------|-------------------|------------------|
| + 5.0      | 10                       | 100.0              | 10 - 100          | +/- 1%           |
| + 12.0     | --                       | 20 cont<br>27 peak | 0 - 20<br>20 - 27 | +/- 1%<br>+/- 5% |
| -12.0      | --                       | 6.0                | 0 - 6             | +/- 2%           |

#### Electrical specifications:

|                             |                                                 |
|-----------------------------|-------------------------------------------------|
| AC input range              | : 90 - 132 Vac; 180 - 264 Vac input selectable  |
| AC input frequency          | : 47 to 63Hz                                    |
| Output                      | : 700 watts continuous, total from all outputs  |
| Holdover storage            | : 16msec from the last peak of the line voltage |
| Isolation voltage           | : 1500 Vac as per IEC 380                       |
| Turn-on surge current (max) | : Less than 50A at 110Vac peak (2 cycles max)   |
| Leakage current             | : Less than 3.5mA RMS at 264Vac 50Hz            |
| Safety standards            | : VDE 0871/6.78 class B; IEC 380                |
| Regulation                  | : +5Vdc is sensed                               |

#### Environmental specifications:

|                     |                                                                                |
|---------------------|--------------------------------------------------------------------------------|
| Temperature         |                                                                                |
| Storage             | : -55 to +85 degrees C                                                         |
| Operating (ambient) | : 0 to 60 degrees C (continuous duty)                                          |
| Cooling             | : The power supply meets all specifications with a maximum air flow of 100 CFM |
| Shock and vibration | : 25g shock, 11ms duration, 1/2 sine wave in 3 planes.                         |

## 8.5.2 Connection

| Connector TB1 | Function   | Wire colour  | Connection to |
|---------------|------------|--------------|---------------|
| Pin L         | AC hot     | Brown        | Mains filter  |
| Pin N         | AC neutral | Blue         | Mains filter  |
| Pin Gnd       | Pr. ground | Green/Yellow | Mains filter  |

| Connector TB2 | Function                        | Wire colour                    | Connection to                         |
|---------------|---------------------------------|--------------------------------|---------------------------------------|
| Pin 1         | Not used                        | - -                            |                                       |
| Pin 2         | Not used                        | - -                            |                                       |
| Pin 3         | + 12Vdc                         | Orange(thin)<br>Orange (thick) | Backplane J27-3<br>Power board + 12V  |
| Pin 4         | + 12Vdc/-12Vdc<br>common return | Black (thin)<br>Black (thick)  | Backplane J27-4<br>Power board RETURN |
| Pin 5         | -12Vdc                          | Blue<br>Purple                 | Backplane J27-5<br>Power board -12V   |

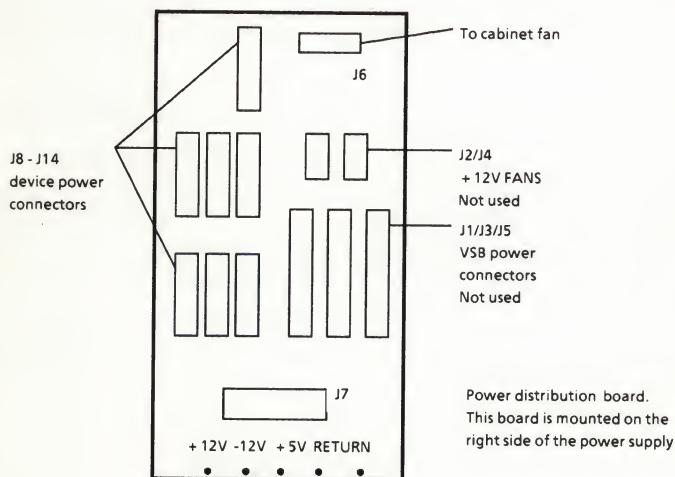
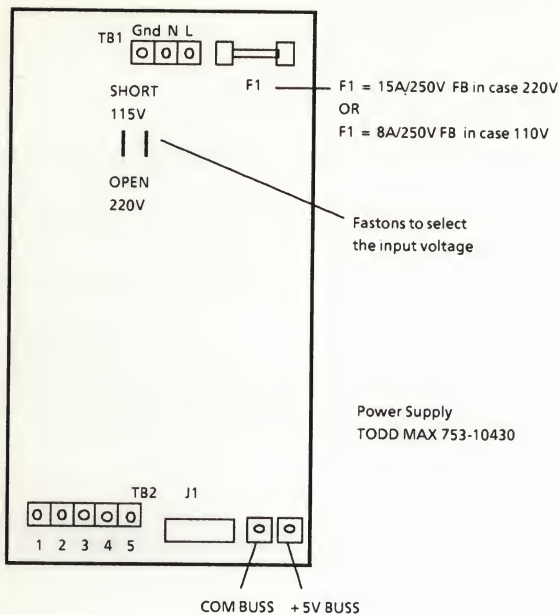
| Connector J1 | FUNCTION | Wire colour | Connection to |
|--------------|----------|-------------|---------------|
| INH          | Not used | - -         |               |
| PF           | Not used | - -         |               |
| -S           | Sense    | Black       | COM BUSS      |
| + S          | Sense    | Red         | + 5V BUSS     |

| Buss      | Function    | Wire colour | Connection to                       |
|-----------|-------------|-------------|-------------------------------------|
| + 5V Buss | + 5V        | Red         | Backplane J28<br>Power poard + 5V   |
| Com Buss  | + 5V return | Black       | Backplane J29<br>Power board RETURN |

## 8.5.3 Strapsettings

For readjusting the 5Vdc output, see section 8.6.5 (Maintenance).

The power supply is strapped for the mains input voltage in according to the ordering information. On the type plate the strapped input voltage is indicated via a red arrow.  
For the mains voltage range strap see the figure below.





#### 8.5.4. Installation

##### Removal :

- Disconnect the mains cable.
- Remove the cover from the P9070, take care for cable damage.
- Follow the ESD rules.
- If you are not sure about the way the cables and wires are connected to the power supply, make a note of it.
- Take care not to damage the cables and wires running at the right of the power supply.
- Disconnect the cables running from the power distribution board.
- Remove the power supply bracket lock screw, at the lower right side of the power supply.
- Lift up the power supply and carefully remove the power supply as far as possible.
- Remove the cables and wires running from the power supply.
- Slide the power supply completely out ( take care not to damage any cabling ).
- Remove the bracket used to mount the power distribution board.
- Exchange the power supply.

##### Replacement :

- This can be done by following the removal procedure in the reverse order.

#### 8.5.5 Maintenance

If the output of the system power supply degrades with the original configuration (or a load that has worked satisfactorily for an extended period of time), the power supply should be replaced, since degradation under static load is a precursor to power supply failure.

When subassemblies are added to the system cabinet it may be necessary to readjust the 5Vdc.

The adjusting potentiometers can be reached via the holes in the front cover of the power supply. The holes are marked as follows:

- NO1 V ADJ      Used for the +5Vdc adjustment.
- NO2 V ADJ      Used for the +12Vdc adjustment. Do not readjust.
- NO3 V ADJ      Used for the -12Vdc adjustment. Do not readjust.

No other voltages should be adjusted or balance adjustments changed. Use a meter with at least a 5% dc accuracy. The 5Vdc should not be adjusted above 5.10Vdc measured at the backplane.

## 8.6 Power Supply P9070 TODD 700 watts

### 8.6.1 Characteristics

This power supply is a 700 watts auto ranging power supply. This power supply **may not** be used in P9070 systems using an MVME188(A) RISC processor module. The power supply to be used in the P9070 using an MVME188(A) RISC processor module is the one mentioned in section 8.5.

| DC voltage | Min load current in Amps | Current in Amps    | Loads in Amps     | Total regulation |
|------------|--------------------------|--------------------|-------------------|------------------|
| + 5.0      | 10                       | 100.0              | 10 - 100          | +/- 1%           |
| + 12.0     | --                       | 20 cont<br>27 peak | 0 - 20<br>20 - 27 | +/- 1%<br>+/- 5% |
| -12.0      | --                       | 6.0                | 0 - 6             | +/- 2%           |

#### Electrical specifications:

|                             |                                                             |
|-----------------------------|-------------------------------------------------------------|
| AC input range              | : 90 - 132 Vac, auto ranging<br>180 - 264 Vac, auto ranging |
| AC input frequency          | : 47 to 63Hz                                                |
| Output                      | : 700 watts continuous, total from all outputs              |
| Holdover storage            | : 16msec from the last peak of the line voltage             |
| Isolation voltage           | : 1500 Vac as per IEC 380                                   |
| Turn-on surge current (max) | : Less than 50A at 110Vac peak (2 cycles max)               |
| Leakage current             | : Less than 3.5mA RMS at 264Vac 50Hz                        |
| Safety standards            | : VDE 0871/6.78 class B; IEC 380                            |
| Regulation                  | : + 5Vdc is sensed                                          |

#### Environmental specifications:

|                     |                                                                                |
|---------------------|--------------------------------------------------------------------------------|
| Temperature         |                                                                                |
| Storage             | : -55 to +85 degrees C                                                         |
| Operating (ambient) | : 0 to 60 degrees C (continuous duty)                                          |
| Cooling             | : The power supply meets all specifications with a maximum air flow of 100 CFM |
| Shock and vibration | : 25g shock, 11ms duration, 1/2 sine wave in 3 planes.                         |

## 8.6.2 Connection

| Connector TB1 | Function   | Wire colour  | Connection to |
|---------------|------------|--------------|---------------|
| Pin L         | AC hot     | Brown        | Mains filter  |
| Pin N         | AC neutral | Blue         | Mains filter  |
| Pin Gnd       | Pr. ground | Green/Yellow | Mains filter  |

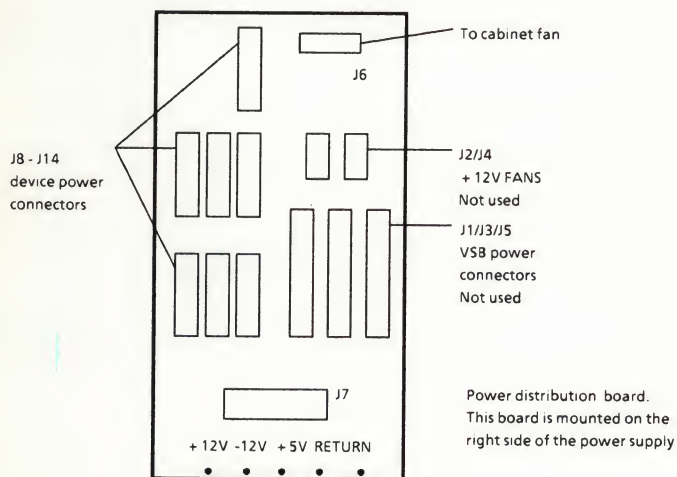
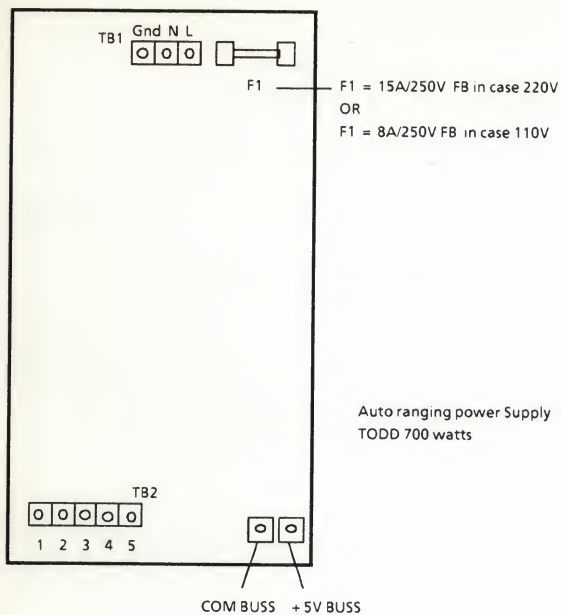
| Connector TB2 | Function                        | Wire colour | Connection to                         |
|---------------|---------------------------------|-------------|---------------------------------------|
| Pin 1         | + 12Vdc/-12Vdc<br>common return | Black       | Backplane J27-4<br>Power board RETURN |
| Pin 2         | + 12Vdc                         | Orange      | Backplane J27-3                       |
| Pin 3         | + 12Vdc                         | Orange      | Power board + 12V                     |
| Pin 4         | + 12Vdc/-12Vdc<br>common return | Black       | Backplane J27-4<br>Power board RETURN |
| Pin 5         | -12Vdc                          | Blue        | Backplane J27-5<br>Power board -12V   |

| Connector J1 | FUNCTION | Wire colour | Connection to |
|--------------|----------|-------------|---------------|
| INH          | Not used | - -         |               |
| PF           | Not used | - -         |               |
| -S           | Sense    | Black       | COM BUSS      |
| + S          | Sense    | Red         | + 5V BUSS     |

## 8.6.3 Strapsettings

For readjusting the 5Vdc output, see section 8.6.5 (Maintenance).

The power supply is an auto ranging power supply, so strapping for the mains input voltage is not required.





## 8.6.4. Installation

### Removal :

- Disconnect the mains cable.
- Remove the cover from the P9070, take care for cable damage.
- Follow the ESD rules.
- If you are not sure about the way the cables and wires are connected to the power supply, make a note of it.
- Take care not to damage the cables and wires running at the right of the power supply.
- Disconnect the cables running from the power distribution board.
- Remove the power supply bracket lock screw, at the lower right side of the power supply.
- Lift up the power supply and carefully remove the power supply as far as possible.
- Remove the cables and wires running from the power supply.
- Slide the power supply completely out ( take care not to damage any cabling ).
- Remove the bracket used to mount the power distribution board.
- Exchange the power supply.

### Replacement :

- This can be done by following the removal procedure in the reverse order.

## 8.6.5 Maintenance

If the output of the system power supply degrades with the original configuration (or a load that has worked satisfactorily for an extended period of time), the power supply should be replaced, since degradation under static load is a precursor to power supply failure.

When subassemblies are added to the system cabinet it may be necessary to readjust the 5Vdc.

The adjusting potentiometers can be reached via the holes in the front cover of the power supply. The holes are marked as follows:

- NO1 V ADJ      Used for the +5Vdc adjustment.
- NO2 V ADJ      Used for the +12Vdc adjustment. Do not readjust.
- NO3 V ADJ      Used for the -12Vdc adjustment. Do not readjust.

No other voltages should be adjusted or balance adjustments changed. Use a meter with at least a 5% dc accuracy. The 5Vdc should not be adjusted above 5.10Vdc measured at the backplane.

## 8.7 Power Supply P9090 Boschert XL1000-46XX

### 8.7.1 Characteristics

This power supply is switch selectable for the voltage range:

- low voltage range (90 - 132V)
- high voltage range (180 - 264V)

| DC voltage | Min load current in Amps | Current in Amps | Total regulation |
|------------|--------------------------|-----------------|------------------|
| + 5.0      | 15                       | 150             | +/- 1%           |
| -5.0       | --                       | 10              | +/- 1%           |
| + 12.0     | --                       | 20              | +/- 1%           |
| -12.0      | --                       | 20              | +/- 1%           |
| 12.0       | --                       | 8               | +/- 1%           |

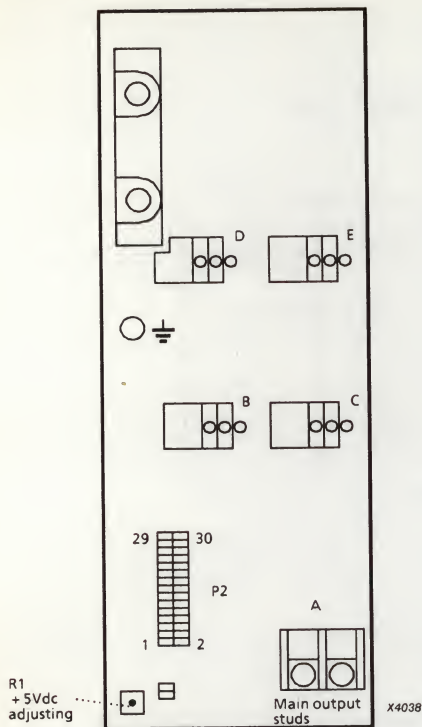
#### Electrical specifications:

|                             |                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------|
| AC input range              | : 90 - 132 Vac, auto ranging<br>180 - 264 Vac, auto ranging                                 |
| AC input frequency          | : 47 to 63Hz                                                                                |
| Output                      | : 1250 watts continuous, total from all outputs                                             |
| Holdover storage            | : 40msec from the last peak of the line voltage                                             |
| Isolation voltage           | : 1500 Vac as per IEC 380                                                                   |
| Turn-on surge current (max) | : Less than 75A at 110Vac peak (2 cycles max)                                               |
| Leakage current             | : Less than 2.0mA RMS at 264Vac 50Hz                                                        |
| Safety standards            | : UL recognized, CSA certified, VDE approved for CLASS 1 SELV. VDE: EMI regulations         |
| Regulation                  | : + 5Vdc is sensed                                                                          |
| Over temperature protection | : Unit shuts down when internal temperature exceeds maximum safe rating. Automatic restart. |

#### Environmental specifications:

|                     |                                                     |
|---------------------|-----------------------------------------------------|
| Temperature         |                                                     |
| Storage             | : -20 to + 85 degrees C                             |
| Operating (ambient) | : 0 to 70 degrees C (continuous duty)               |
| Cooling             | : Internal fan                                      |
| Shock and vibration | : 25g shock, 11ms duration, 1/2 sine wave each axis |

## 8.7.2 Connections



| Output Identification | DC Voltage |
|-----------------------|------------|
| A                     | + 5.0      |
| B                     | + 12.0     |
| C                     | -12.0      |
| D                     | -5.0       |
| E                     | 12.0       |

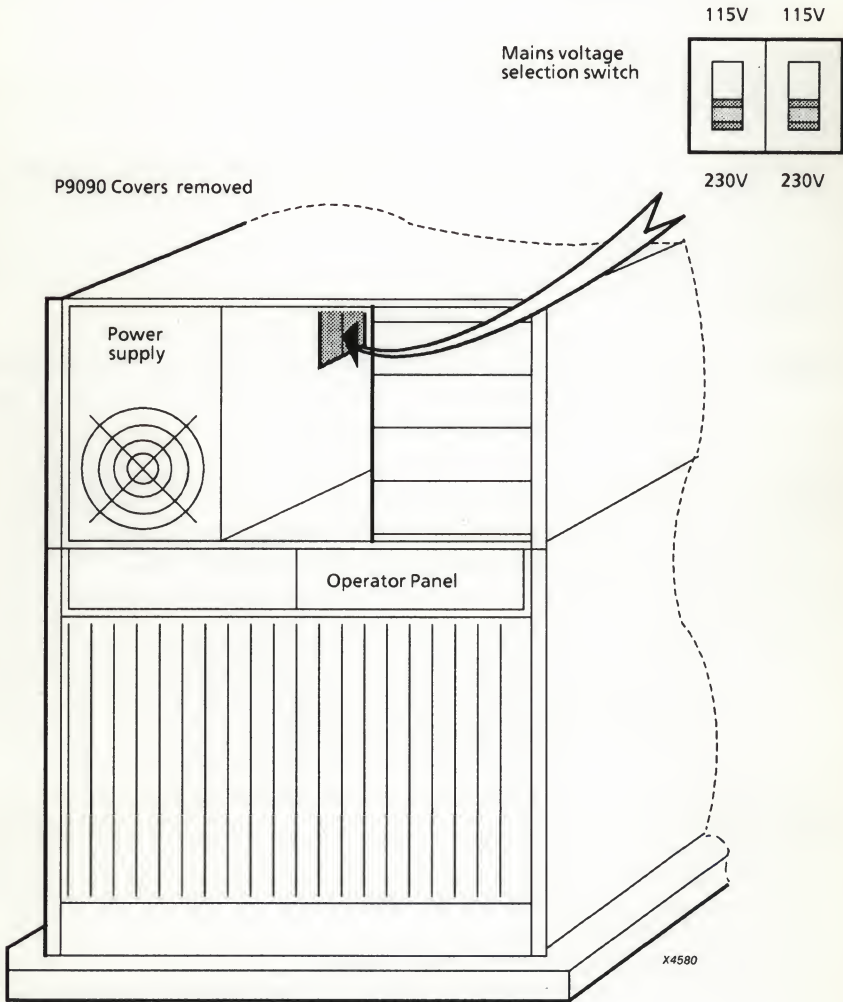
- P1 1. - Sense  
2. + Sense

- P2 1. Aux Spare  
2. Aux Spare  
3. (Key)  
4. Aux Spare  
5. Aux Spare  
6. Power Fail Detect  
7. IMON  
8. ITOTAL  
9. Parallel Bus  
10. Advance Thermal Warning  
11. Hot  
12. O.V.P. Disable  
13. Low Margin  
14. High Margin  
15. Overvoltage Protection

16. Invert In  
17. Invert Out  
18. Drain  
19. Gate  
20. -24V  
21. Reset  
22. Inhibit Select  
23. Inhibit B  
24. OVP Trigger  
25. Inhibit D  
26. Control Ground  
27. Direct Margin  
28. Inhibit A  
29. Out OK  
30. Undervoltage Shutdown Enable

### 8.7.3 Strapsetting

For readjusting the 5Vdc output, see section 8.7.5 (Maintenance). The mains voltage range switch needs checking and setting for the correct range, see below.





## 8.7.4 Installation

### Power Supply and AC Filter Removal/Replacement

**NOTE:** For this procedure "left" and "right" are as viewed from the rear of the enclosure or chassis.

#### Removal

- Ensure that chassis power is OFF, and that the power cord is removed from the chassis.

**WARNING: VOLTAGES CAPABLE OF CAUSING DEATH ARE PRESENT IN THE CHASSIS.**

- Remove the top and right skins from the enclosure. Remove the front bezel from the drive subchassis. Locate the skins and bezel in a place that will prevent damage.

**NOTE:** The skins are held on by ball stud pop-on-pop-off catches. Remove the skins by pulling straight out. The skins can be easily removed and no additional leverage should be required.

- Remove the six Phillips screws along the top and sides of the rear door of the drive (top) subchassis, and open the door downward.
- Remove the two screws holding plate 64-W5548B01 on the floor of the drive chassis directly in front of the power supply, and remove the plate.
- Identify the wires connected to the power supply so they will be properly replaced.

**NOTE:** It is not necessary to unduly move the wiring harnesses to remove the power supply. The power supply will slide away from the harnesses, simplifying replacement. Simply noting the colours and power supply terminals should be sufficient identification.

- Remove the DC harness wires from the power supply by unscrewing the screws and sliding out the spade lugs. DO NOT remove the wires connected to the filter, they can be removed more easily later.
- Using a 1/2-inch wrench, remove the nuts from the main outputs studs and remove the wires connected to them. When replacing, tighten firmly. Ninety inch-pounds is specified.
- Unplug the control plug from the Power Supply.
- Disconnect the AC harness from the filter. These are removed by pulling straight out.
- Remove the four Phillips screws on the right side of the drive subchassis directly opposite the power supply.
- Slide the power supply, plate 07-W5553B01, and filter out the front of the drive subchassis.

- The wires between the filter and power supply can be disconnected by unplugging from the filter or by removing the screws and ring lugs from the power supply, as appropriate.
- The power supply can be removed from the plate by removing the 8 Phillips screws.
- The filter can be removed from the plate by removing the 6 Phillips screws.

#### **Replacement:**

To replace the power supply or filter, perform the removal procedure in reverse order.

**WARNING:** *The power supply must be set to the same input voltage as is indicated on the chassis rating panel. Any other setting may nullify regulatory approval.*

**CAUTION:** *Although new power supplies are normally shipped set for 110 Vac operation, the installer must ensure the input voltage is set properly to prevent damage to the power supply, chassis or modules.*

### **8.7.5 Maintenance**

If the output of the system power supply degrades with the original configuration (or a load that has worked satisfactorily for an extended period of time), the power supply should be replaced, since degradation under static load is a precursor to power supply failure.

When subassemblies are added to the system cabinet it may be necessary to readjust the 5Vdc. No other voltages should be adjusted or balance adjustments changed. Use a meter with at least a 5% dc accuracy. The 5Vdc should not be adjusted above 5.10Vdc measured at the backplane.

Adjustment procedure for the power supply of the P9090:

- Powerdown the system in the correct way and switch it off.
- Disconnect the mains cable.
- Pull the plug from the rear panel and open the rear panel downwards.
- Remove the plates from the cabinet enclosure.
- Open one of the two little doors at the side of the chassis to reach the backplane.
- Connect the leads of the Vdc-meter to the 5V-studs on the backplane, via properly insulated crocodile clips.

- Connect the mains cable, power on and start the system.
- Adjusting the 5Vdc is done with the potmeter R1.  
R1 can be reached at the rear of the power supply, left bottom, see locator section 8.7.2.
- Powerdown the system in the correct way and switch it off.
- Disconnect the mains cable.
- Remove the crocodile clips from the backplane.
- Secure R1 again with a suitable seal.
- Close the door in the side panel and secure it with the screws. Close the rear panel and secure it with the screws. Connect the mains cable.

## **8.8      Uninterruptable Power Supply (UPS)**

### **8.8.1      Characteristics**

#### **Hardware required**

A reliable UPS which should have:

- An RS-232 compatible output signal "Power Fail", that can be connected to a serial port of the system.
- A capacity equal (or bigger than the power consumption of the configuration connected to this UPS.

#### **Software required**

The UPS software package for the P9000 m-systems equipped with a CISC processor is the Auto Shutdown Application Packet (PASAP), Release UP81.04P or later.

It consists of: - Streamer with PASAP (UP81.04P)  
                              - Software Release Guide

This PASAP package requires at least system V/68 FE 83.11 (R3V5).

The PASAP package for the P9000 m-systems equipped with a RISC processor is the PASAP package, release UO81.01P.

It consists of: - Streamer with PASAP (UO81.01P)  
                              - Software Release Guide

This PASAP package requires at least system V/88 R32V2 or higher.

### **8.8.2      Connection**

The UPS is connected to the system via a special RS-232 cable, see also section 8.9. Use a free tty-port. Do not use the port tty01.

### **8.8.3      Strapsettings**

Not applicable.

### **8.8.4      Installation**

#### **Hardware**

Follow the instructions mentioned in the Installation Manual of the UPS. It is recommended to start using the UPS when the batteries have been fully charged, so it can do its job immediately when necessary.

The outgoing RS-232C signal "Power Fail", from the UPS must be connected to a free tty-port. When connected to a port on a Delta Link Server this Delta Link Server should also receive its power from the UPS.



The signal/line to connect is:

- system port (= DB 25 connector) ↔ output UPS
  - pin 7 ground ↔ pin x 0
  - pin 8 DCD ↔ pin x 1
  - pin 20 DTR ↔ pin x 2
- For the installation of the software package see the Software Release Guide.

- REMARKS:**
1. *The MOTOROLA UPS has a relay/switch between pins x1 and x2. When AC drops this UPS will close that switch after a delay, standard 30 seconds. The signal DTR will then be connected to pin DCD, and the PASAP program will start the POWER DOWN procedure.*
  2. *When the signal "Power Fail" is active between +5V and +15V (RS-232C) it is sufficient to connect this signal to pin 8/DCD.*

### 8.8.5 Maintenance

**NOTE:** *The UPS is a class C product: no deliveries through the Product Group P9000 m-series, no support from Customer Support Technical Operations. For the PASAP package contact the Product Group P9000 m-series.*

## 8.9 P9000-083 UPS 600VA

The P9000-083 UPS 600VA is the successor of the P9000-081 UPS 560VA.

The UPS takes over the mains supply function in case of a power failure. It signals the UPS software in the P9000 m-system about the occurrence of the mains failure. Short mains failures will be bridged by the UPS. If the mains does not return within a certain interval (configured in the UPS software), the UPS software initiates a graceful shutdown of the system. At the end of the shutdown the UPS software switches of the UPS, in order to prevent total discharge of the batteries in the UPS.

### Software required

The UPS software package for the P9000 m-systems equipped with a CISC processor is the Auto Shutdown Application Packet (PASAP), Release UP81.04P or later.

It consists of: - Streamer with PASAP (UP81.04P)  
- Software Release Guide

This PASAP package requires at least system V/68 FE 83.11 (R3V5).

The PASAP package for the P9000 m-systems equipped with a RISC processor is the PASAP package, release UO81.01P.

It consists of: - Streamer with PASAP (UO81.01P)  
- Software Release Guide

This PASAP package requires at least system V/88 R32V2 or higher.

### 8.9.1 Characteristics

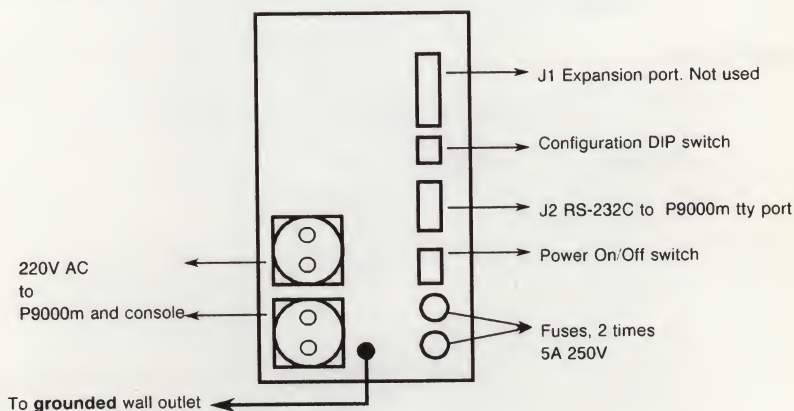
#### Identification:

|              |                  |
|--------------|------------------|
| Name         | : UPS 600VA      |
| P-Number     | : P9000-083      |
| Service 12NC | : 5322 218 80952 |

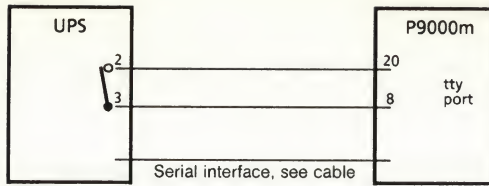
## Technical Data:

|                                      |                                                                     |
|--------------------------------------|---------------------------------------------------------------------|
| Type of UPS                          | : offline                                                           |
| Mains input voltage                  | : 220-240 VAC 50Hz                                                  |
| Output voltage/frequency             |                                                                     |
| - mains present                      | : equal to input voltage and frequency                              |
| - battery mode                       | : 230VAC 50Hz $\pm 3\%$                                             |
| Max. output power                    | : 600 VA mains                                                      |
| Battery backup time                  | : min. 4 minutes,<br>typ. 6 to 9 minutes (dep. on connected system) |
| Battery recharge time                | : max. 8 hours                                                      |
| Switching time                       | : max. 6 ms                                                         |
| Noise level                          | line operation : < 45 dBA<br>battery operation : < 45 dBA           |
| Dimensions (H $\times$ W $\times$ D) | : 22.5 $\times$ 14.3 $\times$ 40.0 cm                               |
| Weight                               | : 15 kg                                                             |

## 8.9.2 Connection



When the UPS switches to battery operation it closes a relay contact and connects the P9000m serial interface signal DTR to DCD. This is detected by the UPS software in the P9000m.



### Cable between UPS and P9000m (1.5m)

| P9000m<br>25-pins<br>connector | OR   | P9000m<br>9-pins<br>connector | UPS<br>15-pins (male)<br>connector |
|--------------------------------|------|-------------------------------|------------------------------------|
| TxD 2                          | ———— | TxD 3                         | 10 Inverter Shutdown               |
| GND 7                          | ———— | GND 5                         | 5 Ground                           |
| DCD 8                          | ———— | DCD 1                         | 3 AC Fail (relay)                  |
| DTR 20                         | ———— | DTR 4                         | 2 Relay common                     |
| Shield                         | ———— | Shield                        | 15 Shield                          |

### 8.9.3 Strap Setting

Near the interface connector are the configuration DIP switches, 4 in total:

|  |       |                                                                     |
|--|-------|---------------------------------------------------------------------|
|  | 4 Off | UPS expects to receive inverter shutdown command on J2 pin 10       |
|  | 3 On  | AC Fail relay is normally open. Closed to indicate mains power loss |
|  | 2 Off | UPS ignores RS-232C serial data at J2 pin 6                         |
|  | 1 On  | UPS accepts inverter shutdown command at J2 pin 10                  |

The position of the configuration switches is read when the UPS is switched on.



## **8.9.4 Installation**

Do not damage nor discard the shipping container or packing materials, as these must be used in case the UPS needs to be returned. Inspect the UPS for signs of damage. Report any damage on the installation forms

Set the DIP switches to the correct positions, see section 8.9.3.

Locate the UPS in a ventilated area, away from heat sources. Allow adequate air circulation, ensure that none of the ventilation openings are blocked, but that foreign objects can not easily be dropped or pushed into the openings.

Connect the UPS mains cable to a grounded wall outlet and switch the UPS on with the power switch at the rear side. When the power switch is on, power is present at both rear panel receptacles.

The firmware of the UPS performs a start up test. The LEDs on the front panel will flash and the unit will emit a short beep. When the flashing stops, all LEDs should be continuously green. If not, see section 8.9.5 Maintenance.

Switch off the UPS and connect the system (power and serial cable) and the console to the UPS. Switch the system and console on. Switch the UPS on.

To verify the functioning of the UPS the UPS DOS software can be run (see section 8.9.5). Do not disconnect the power cord of the UPS to simulate a power failure, but make use of the test functions of the UPS. The UPS should not operate without the ground connection!

Note that the batteries of the UPS are always being charged when the UPS is connected to the mains, even if the power switch is off.

## **8.9.5 Maintenance**

### **Preventive maintenance**

Preventive maintenance is limited to replacement of the batteries when their capacity is reduced to 80%. This will typically be after 4 years of operation of the UPS.

To replace the batteries, take off the cover of the UPS by removing the 2 screws at the upper rear side, and lifting and shifting the cover backwards. Remove the 4 screws of the mounting bracket of the batteries. Replace the batteries by one of the following approved types:

- Panasonic : LCR 6V10PA.1
- Panasonic : LCR 6V10PB.1
- GS (Japan Storage Battery Co.) : PE10-6R-F2
- CSB (Taiwan Kobe Battery Co.) : GP6100-F2
- Power Sonic : PS-6100-F2

### **Corrective maintenance**

Corrective maintenance is limited to changing a fuse if one has been blown. In case of a malfunctioning unit, replace it completely and send the faulty one in for repair.

### **Diagnostic functions of P9000-083 UPS 600VA**

#### **Test LED**

- Flashing green : Power on test active.
- Green : Test passed.
- Flashing yellow/green : Battery low. If test result does not change within 6 hours, replace the battery.
- Red : Overloaded. Unplug some equipment from the UPS.
- Flashing red : Hardware fault, replace UPS.

#### **Line voltage LED**

- Flashing yellow/green : Approaching low line situation.
- Yellow : Low line condition, UPS switches to battery.
- Flashing red/green : Approaching high line situation.
- Red : High line condition, UPS switches to battery.
- Flashing yellow : Line frequency out of tolerance, UPS switches to battery.

#### **Load LED**

- Green : Load < 80%
- Yellow : 80% < Load < 95%
- Flashing yellow : 95% < Load < 100%
- Red : Overload, no battery hold up if power fails.

#### **Battery LED**

- Green : Batteries charged.
- Yellow : Batteries are being charged. If this condition lasts longer than 6 hours, replace the batteries.
- Flashing green : Power is drawn from batteries.
- Flashing yellow : Advance warning for battery low condition.
- Flashing red : Battery low, shutdown initiated.

## Temperature LED

- Green : Internal temperature below limit.
- Red : Internal temperature reaches limit, output power will be lost approx. 30 seconds later. Turn the unit off and check for overload and/or ventilation problems.

## Test button

Pressing the TEST button for two seconds simulates a power outage which causes the UPS to enter a power backup mode during a few seconds. The test result is shown on the Operator panel LEDs, see previous page.

## Silence button

The SILENCE button silences the audible alarm which normally occurs every 15 seconds during a power outage. When the power returns the alarm is re-armed.

## UPS Console Software

The UPS Console software is originally developed by the manufacturer ELGAR as IPS control software running under DOS. It can be used as an extension to the Selftest and to the operator panel TEST button diagnostic. It can be run via a PC connected to the UPS from a (bootable) DOS diskette or from a DOS partition on the system disk, or on a second (engineer) PC, connected to the UPS via it's serial port.

This UPS Console software is present on SIR.

The cable used for the connection between the UPS and the PC should like as follows:

25-pins  
connector

UPS  
15-pins (male)  
connector

|        |    |    |                |
|--------|----|----|----------------|
| DTR    | 20 | 2  | Relay common   |
| DSR    | 6  | 3  | AC Fail        |
| DCD    | 8  |    |                |
| GND    | 7  | 5  | GND            |
| TXD    | 2  | 6  | RS-232C input  |
| RXD    | 3  | 13 | RS-232C output |
| CTS    | 5  | 14 | CTS            |
| Shield |    | 15 | Shield         |

The UPS Console software consists of the following files:

|              |                                                                                     |
|--------------|-------------------------------------------------------------------------------------|
| ELGAR.COM    | UPS driver (TSR-program)                                                            |
| ELGARREM.COM | Removes UPS driver from memory                                                      |
| ELGAR.CFG    | Configuration file for ELGAR.COM                                                    |
| IPSCON.EXE   | Console program for UPS                                                             |
| INSTALL.EXE  | Installation program (not required)                                                 |
| EL_COM1.CFG  | Predefined configuration file for COM1 (can be copied to ELGAR.CFG for use of COM1) |
| EL_COM2.CFG  | Predefined configuration file for COM2 (can be copied to ELGAR.CFG for use of COM2) |

To run the control software:

- Copy the appropriate configuration file to ELGAR.CFG.
- Start ELGAR.COM. If an error message appears probably the wrong configuration file is used.
- Start IPSCON.EXE. Note that this program uses colors, of which some might not be very well visible on all monochrome screens.
- The startup screen gives the possibility to select a:
  - status screen : gives the status of the UPS, the connected load and the commercial power
  - setup screen : to change parameters as wink time, voltage limits, intervals between automatic selftests etc.
  - test screen : to start a hardware selftest, a real battery test and a test of the operator panel LEDs. The battery test should be run with the P9000m and console connected to the power outlets of the UPS. The test will discharge the batteries completely.
  - log screen : to examine power and test logs

Help is available throughout the program.





Section:

Page:

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|-------------------|-------|

|                |        |        |        |        |        |
|----------------|--------|--------|--------|--------|--------|
| 2: MVME131     | 9.2-1  | 9.2-1  | 9.2-2  | 9.2-8  | 9.2-8  |
| 3: MVME132     | 9.3-1  | 9.3-1  | 9.3-3  | 9.3-8  | 9.3-8  |
| 4: MVME134     | 9.4-1  | 9.4-1  | 9.4-2  | 9.4-5  | 9.4-5  |
| 5: MVME141     | 9.5-1  | 9.5-2  | 9.5-3  | 9.5-6  | 9.5-6  |
| 6: MVME147     | 9.6-1  | 9.6-2  | 9.6-3  | 9.6-7  | 9.6-7  |
| 7: MVME147S    | 9.7-1  | 9.7-2  | 9.7-3  | 9.7-6  | 9.7-6  |
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Subsection:

|   |                 |       |   |
|---|-----------------|-------|---|
| 1 | Characteristics | _____ | ↑ |
| 2 | Connections     | _____ | ↑ |
| 3 | Strap Settings  | _____ | ↑ |
| 4 | Installation    | _____ | ↑ |
| 5 | Maintenance     | _____ | ↑ |



## 9.1 TECHNICAL DATA

| CPU NAME                | MVME131<br>DOF | MVME131<br>XT            | MVME132<br>DOF | MVME132<br>XT     | MVME134 |
|-------------------------|----------------|--------------------------|----------------|-------------------|---------|
| Card Names              | MVME130        | MVME130<br>CACHE2<br>MMB | MVME130<br>MMB | MVME130<br>CACHE3 | MVME134 |
| Transition Module       | MVME707        | MVME707                  | MVME707        | MVME707           | MVME716 |
| MPU type                | 68020          | 68020                    | 68020          | 68020             | 68020   |
| Floating Point Co-proc. | 68881          | 68881                    | 68881          | 68881             | 68881   |
| Paged Mem Man Unit      | MMB851         | MMB851                   | 68851          | 68851             | 68851   |
| Cache                   | No             | 16Kbyte                  | No             | 16Kbyte           | No      |
| Speed                   | 16.7MHz        | 16.7MHz                  | 16.7MHz        | 16.7MHz           | 16.7MHz |
| Physical No. of Slots   | 2              | 3                        | 1              | 2                 | 1       |
| Buses:                  |                |                          |                |                   |         |
| VME-Bus                 | Yes            | Yes                      | Yes            | Yes               | Yes     |
| VSB *                   | Yes            | Yes                      | Yes            | Yes               | No      |
| SCSI-Bus                | No             | No                       | No             | No                | No      |
| Ethernet                | No             | No                       | No             | No                | No      |
| Nr. of serial ports     | 2              | 2                        | 2              | 2                 | 2       |
| Nr. of parallel ports   | 0              | 0                        | 0              | 0                 | 0       |
| On-Board Global Mem.    | No             | No                       | No             | No                | No      |
| Processor Bug           | 130 Bug        | 130 Bug                  | 130 Bug        | 130 Bug           | 134 Bug |
| SSID Name               | test132        | test132                  | test132        | test132           | test134 |

| CPU NAME                | MVME141-1 | MVME141-2 | MVME141-3 |
|-------------------------|-----------|-----------|-----------|
| Transition Module       | MVME714   | MVME714   | MVME714   |
| MPU type                | 68030     | 68030     | 68030     |
| Floating Point Co-proc. | 68882     | 68882     | 68882     |
| Paged Mem Man Unit      | 68030     | 68030     | 68030     |
| Cache                   | 64Kbyte   | 64Kbyte   | 64Kbyte   |
| Speed                   | 25MHz     | 33MHz     | 50MHz     |
| Physical No. of Slots   | 1         | 1         | 1         |
| Buses:                  |           |           |           |
| VME-Bus                 | Yes       | Yes       | Yes       |
| VSB *                   | Yes       | Yes       | Yes       |
| SCSI-Bus                | No        | No        | No        |
| Ethernet                | No        | No        | No        |
| Nr. of serial ports     | 2         | 2         | 2         |
| Nr. of parallel ports   | 0         | 0         | 0         |
| On-Board Global Mem     | No        | No        | No        |
| Processor Bug           | 141 Bug   | 141 Bug   | 141 Bug   |
| SSID Name               | test141   | test141   | test141   |

\* The VSB can only be used when the VSB-cable is installed and a dual ported memory is installed.



| CPU NAME                             | MVME147          | MVME147<br>A     | MVME147<br>-1    | MVME147<br>A-1   | MVME147<br>SRF   |
|--------------------------------------|------------------|------------------|------------------|------------------|------------------|
| Transition Module                    | MVME712          | MVME712          | MVME712          | MVME712          | MVME712          |
| Processor                            | 68030            | 68030            | 68030            | 68030            | 68030            |
| Floating Point Co-proc.              | 68882            | 68882            | 68882            | 68882            | 68882            |
| Paged Mem Man Unit                   | 68030            | 68030            | 68030            | 68030            | 68030            |
| Cache                                | No               | No               | No               | No               | N                |
| Speed                                | 20MHz            | 20MHz            | 25MHz            | 25MHz            | 16MHz            |
| Physical No. of Slots                | 1                | 2                | 1                | 2                | 1                |
| Buses:<br>VME-Bus<br>VSB<br>SCSI-Bus | Yes<br>No<br>Yes | Yes<br>No<br>Yes | Yes<br>No<br>Yes | Yes<br>No<br>Yes | Yes<br>No<br>Yes |
| Ethernet                             | Yes              | Yes              | Yes              | Yes              | No               |
| Nr. of serial ports                  | 4                | 4                | 4                | 4                | 4                |
| Nr. of parallel ports                | 1                | 1                | 1                | 1                | 1                |
| On-Board Global Mem                  | 4Mbyte           | 8Mbyte           | 4Mbyte           | 8Mbyte           | 4Mbyte           |
| Processor Bug                        | 147 Bug          | 147 Bug          | 147 Bug          | 147 Bug          | 147RF Bug        |
| SSID Name                            | test147          | test147          | test147          | test147          | test147          |

| CPU NAME                             | MVME147<br>S     | MVME147A<br>SA   | MVME147<br>S-1   | MVME147<br>SA-1  | MVME147<br>SB-1  | MVME147<br>SC-1  |
|--------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Transition Module                    | MVME712          | MVME712          | MVME712          | MVME712          | MVME712          | MVME712          |
| Processor                            | 68030            | 68030            | 68030            | 68030            | 68030            | 68030            |
| Floating Point Co-proc.              | 68882            | 68882            | 68882            | 68882            | 68882            | 68882            |
| Paged Mem Man Unit                   | 68030            | 68030            | 68030            | 68030            | 68030            | 68030            |
| Cache                                | No               | No               | No               | No               | No               | No               |
| Speed                                | 20MHz            | 20MHz            | 25MHz            | 25MHz            | 25MHz            | 25MHz            |
| Physical No. of Slots                | 1                | 1                | 1                | 1                | 1                | 1                |
| Buses:<br>VME-Bus<br>VSB<br>SCSI-Bus | Yes<br>No<br>Yes | Yes<br>No<br>Yes | Yes<br>No<br>Yes | Yes<br>No<br>Yes | Yes<br>No<br>Yes | Yes<br>No<br>Yes |
| Ethernet                             | Yes              | Yes              | Yes              | Yes              | Yes              | Yes              |
| Nr. of serial ports                  | 4                | 4                | 4                | 4                | 4                | 4                |
| Nr. of parallel ports                | 1                | 1                | 1                | 1                | 1                | 1                |
| On-Board Global Mem                  | 4Mbyte           | 8Mbyte           | 4Mbyte           | 8Mbyte           | 16Mbyte          | 32Mbyte          |
| Processor Bug                        | 147 Bug          | 147 Bug          | 147 Bug          | 147 Bug          | 147 Bug          | 147 Bug          |
| SSID Name                            | test147          | test147          | test147          | test147          | test147          | test147          |

| CPU NAME                | MVME181<br>-1                            | MVME181<br>-2                            | MVME187B<br>MVME187C           |
|-------------------------|------------------------------------------|------------------------------------------|--------------------------------|
| Card Names              | MVME181 Main Module<br>MVME181 8Mb Mezz. | MVME181 Main Module<br>MVME181 8Mb Mezz. | MVME187B<br>MVME187C           |
| Transition Module       | MVME714                                  | MVME714                                  | MVME712A/AM                    |
| Processor               | 88100                                    | 88100                                    | 88100                          |
| Floating Point Co-proc. | 88100                                    | 88100                                    | 88100                          |
| Mem Man Unit            | 2 x 88200                                | 2 x 88200                                | 2 x 88200                      |
| Cache                   | 32Kbyte                                  | 32Kbyte                                  | 32Kbyte                        |
| Speed                   | 20MHz                                    | 25MHz                                    | 25MHz                          |
| Physical No. of Slots   | 2                                        | 2                                        | 1                              |
| Buses:                  |                                          |                                          |                                |
| VME-Bus                 | Yes                                      | Yes                                      | Yes                            |
| VSB                     | No                                       | No                                       | No                             |
| SCSI-Bus                | No                                       | No                                       | Yes                            |
| Ethernet                | No                                       | No                                       | Yes                            |
| Nr. of serial ports     | 2                                        | 2                                        | 2                              |
| Nr. of parallel ports   | 0                                        | 0                                        | 0                              |
| On-Board Global Mem     | 8Mbyte                                   | 8Mbyte                                   | MVME187B 16Mb<br>MVME187C 32Mb |
| Processor Bug           | 181 Bug                                  | 181 Bug                                  | 187 Bug                        |
| SSID Name               | test18x                                  | test18x                                  | test18x                        |

| CPU NAME                                                          | MVME188<br>Single Proc<br>64Kb cache               | MVME188(A)<br>Single Proc<br>128Kb cache           | MVME188<br>Dual Proc<br>64KB cache                 | MVME188(A)<br>Dual Proc<br>128Kb cache             | MVME188(A)<br>Quad Proc<br>128Kb cache             |
|-------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| Card Names                                                        | Syscon<br>MVME288-16<br>MVME288-64<br>CPU<br>Hyper | Syscon<br>MVME288-16<br>MVME288-64<br>CPU<br>Hyper | Syscon<br>MVME288-16<br>MVME288-64<br>CPU<br>Hyper | Syscon<br>MVME288-16<br>MVME288-64<br>CPU<br>Hyper | Syscon<br>MVME288-16<br>MVME288-64<br>CPU<br>Hyper |
| Transition Module                                                 | MVME714                                            | MVME714                                            | MVME714                                            | MVME714                                            | MVME714                                            |
| Hyper module<br>Processor<br>Float Point Co-proc.<br>Mem Man Unit | 1P64<br>1 x 88100<br>1 x 88100<br>4 x 88200        | 1P128<br>1 x 88100<br>1 x 88100<br>4 x 88200       | 2P64<br>2 x 88100<br>2 x 88100<br>4 x 88200        | 2P128<br>2 x 88100<br>2 x 88100<br>8 x 88200       | 4P128<br>4 x 88100<br>4 x 88100<br>8 x 88200       |
| Speed                                                             | 25MHz                                              | 25MHz                                              | 25MHz                                              | 25MHz                                              | 25MHz                                              |
| Physical No. of Slots                                             | 3 till 6                                           | 3 till 6                                           | 3 till 6                                           | 3 till 6                                           | 3 till 6                                           |
| Buses:<br>VME-Bus<br>VSB<br>SCSI-Bus                              | Yes<br>No<br>No                                    | Yes<br>No<br>No                                    | Yes<br>No<br>No                                    | Yes<br>No<br>No                                    | Yes<br>No<br>No                                    |
| Ethernet                                                          | No                                                 | No                                                 | No                                                 | No                                                 | No                                                 |
| Nr. of serial ports                                               | 2                                                  | 2                                                  | 2                                                  | 2                                                  | 2                                                  |
| Nr. of parallel ports                                             | 0                                                  | 0                                                  | 0                                                  | 0                                                  | 0                                                  |
| On-Board Global Mem<br>indicated via the y in<br>MVME188SP-5-y    | 1-4 16Mbyte<br>or<br>1-4 64Mbyte                   | 1-4 16Mbyte<br>or<br>1-4 64Mbyte                   | 1-4 16Mbyte<br>or<br>1-4 64Mbyte                   | 1-4 16Mbyte<br>or<br>1-4 64Mbyte                   | 1-4 times<br>16Mbyte<br>or<br>1-4 times<br>64Mbyte |
| Processor Bug                                                     | 188 Bug                                            | 188 Bug                                            | 188 Bug                                            | 188 Bug                                            | 188 Bug                                            |
| SSID Name                                                         | test18x                                            | test18x                                            | test18x                                            | test18x                                            | test18x                                            |

## 9.2 MVME131

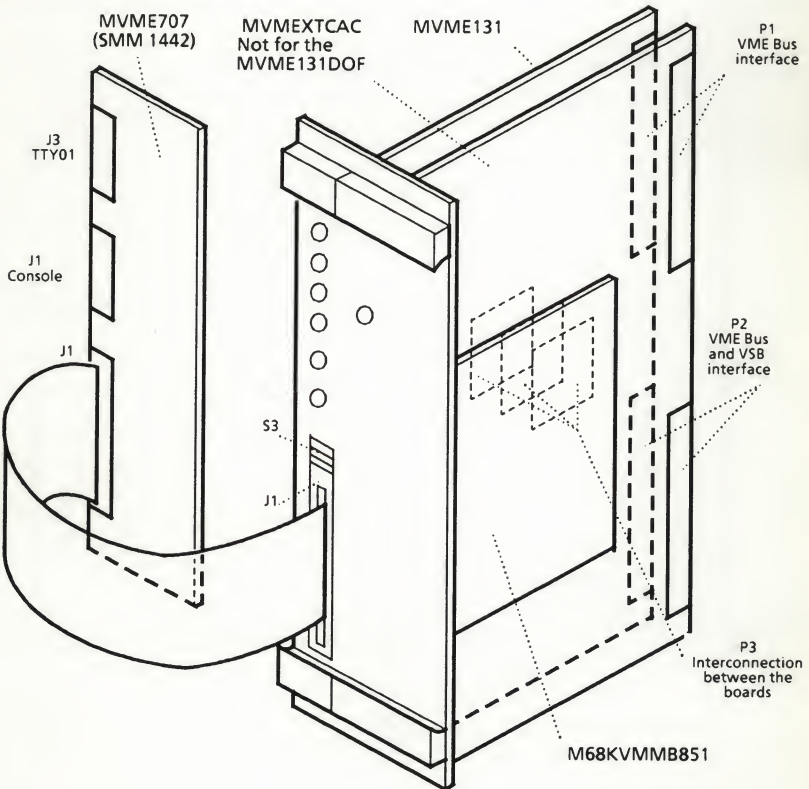
The MVME131, which is End Commercial Delivery, was available in 2 versions, namely:

- MVME131DOF, processor module without cache memory.
- MVME131XT, processor module with cache memory.

### 9.2.1 Characteristics MVME131

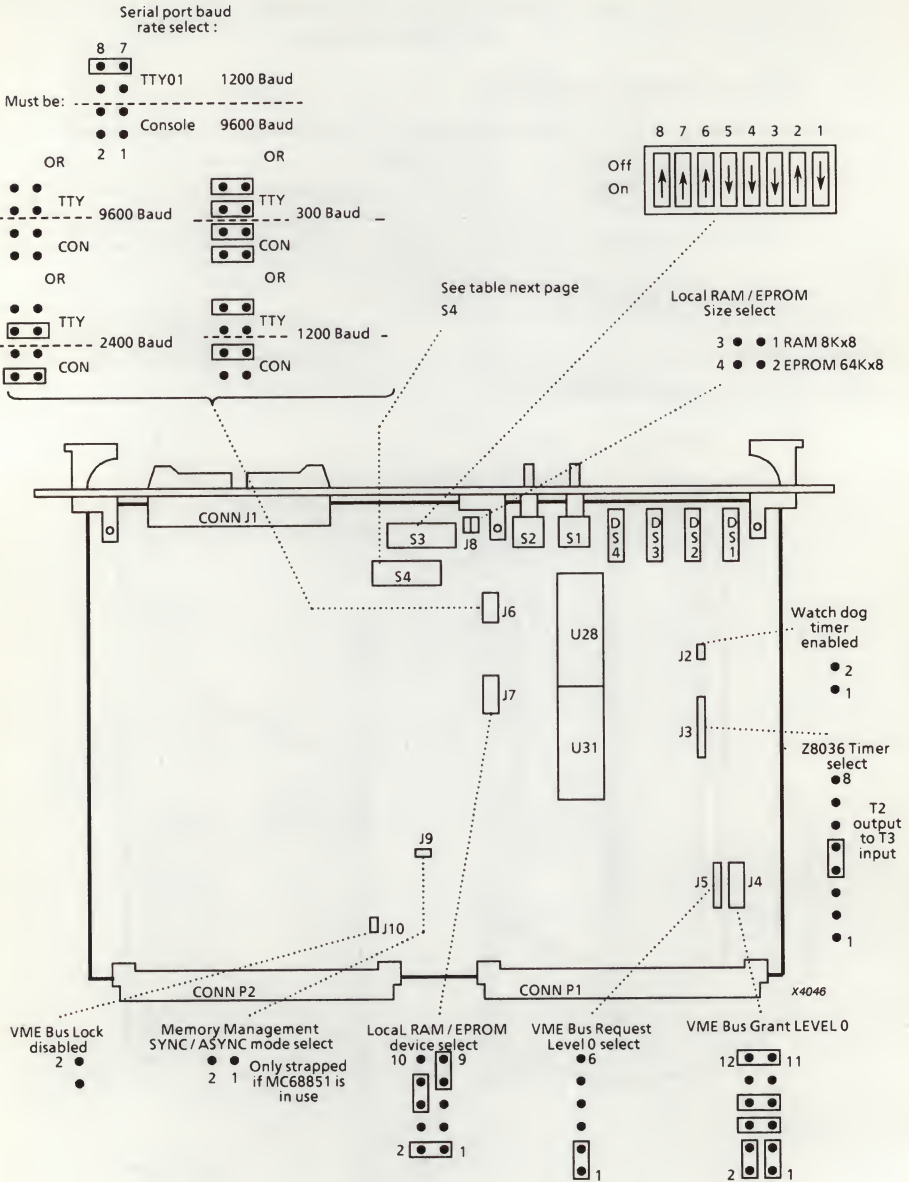
| Power Requirements                 | + 5 Volt |       | + 12 Volt |       | - 12 Volt |       |
|------------------------------------|----------|-------|-----------|-------|-----------|-------|
|                                    | typ.     | max.  | typ.      | max.  | typ.      | max.  |
| MVME131                            | 4.5 A    | 6 A   | 0         |       | 0         |       |
| MVMEXTCAC (not for the MVME131DOF) | 4.3A     | 6.4A  |           |       |           |       |
| MVM707(A)                          |          | .25 A |           | .25 A |           | .25 A |

### 9.2.2 Connections MVME131





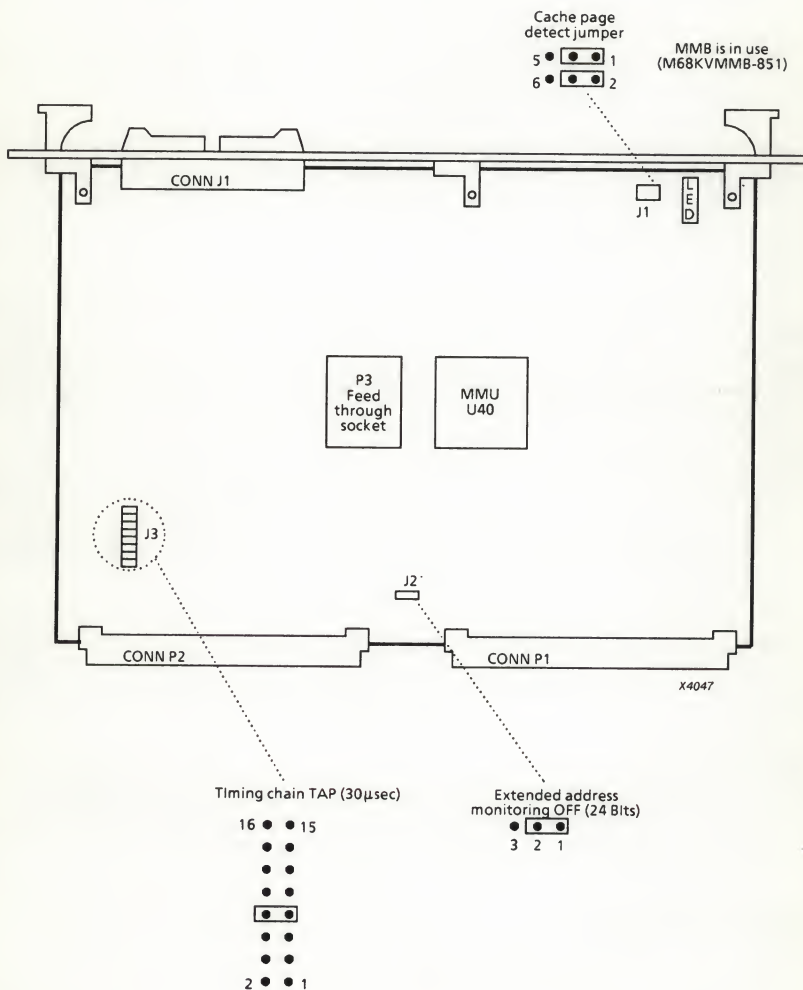
## 9.2.3 Strap Settings MVME131



## M68KMMB851 on MVME131

The Memory Management Board do not requires any strapping.

## MVMEXTCAC on MVME131XT only



## Switch Settings MVME131

### Switch S3

| SWITCH NO. | FUNCTION                       | ON / OFF |
|------------|--------------------------------|----------|
| 1          | Operating Env.Status Bits      | Off      |
| 2          | VME bus Controller (SCON)      | On       |
| 3          | Power up Reset Vector mode     | Off      |
| 4          | Address Modifier select        | Off      |
| 5          | Hold In Reset (EXTRES)         | Off      |
| 6          | Front Panel Switch enable      | On       |
| 7          | Local / VME bus Timeout Select | On       |
| 8          | Local / VME bus Timeout Select | On       |

Note: On = 0, Off = 1

### Switch S4

| SWITCH NO. | FUNCTION                                | With MVME204-2             | With MVME205               | With MVME224               |
|------------|-----------------------------------------|----------------------------|----------------------------|----------------------------|
| 1          | VSB-bus Access Enable (see note*)       | On (VSB)                   | Off                        | On (VSB)                   |
| 2          | VISION 32 Disable                       | On                         | On                         | On                         |
| 3          | Cache Accelerator Enable                | Off (131DOF)<br>On (131XT) | Off (131DOF)<br>On (131XT) | Off (131DOF)<br>On (131XT) |
| 4          | D32 Opt. VME Data width                 | On                         | On                         | On                         |
| 5          | A32 Opt. VME Address Width (see note**) | Off                        | Off                        | Off                        |
| 6          | VSB bus Decode PAL Option               | On                         | On                         | On                         |
| 7          | 131 Base Address                        | On                         | On                         | On                         |
| 8          | 131 Base Address                        | On                         | On                         | On                         |

Note: On = 0, Off = 1

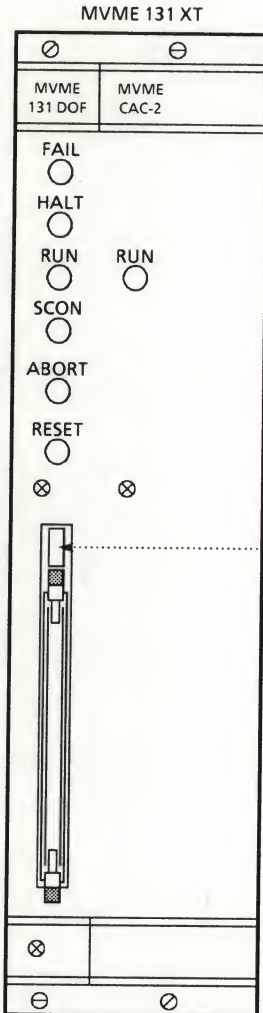
**NOTE \*** : In case of MVME2X4, VSB is in use. VSB cable must be installed.

**NOTE \*\*** : In case of MVME320 the board should be strapped for 24 bits address option A24. In that case the switch must be off.

\* In case of 130BUG V3.2:

- S3-1 = BOOT switch
  - On = auto boot (at power-on/reset)
  - Off = manual boot (using BO/BH commands)
- S4-3 = ENVIR switch
  - On = Processor bug uses local (on board) memory
  - Off = Processor bug uses global (system) memory

## Frontview of MVME131



In case of:  
MVME131DOF the processor module  
is 2 cardslots wide.



### IN CASE OF 130 BUG V3.2 :

- S3-1 = Boot switch
  - On = Autoboot (at Power-On/Reset)
  - Off = Manual boot (using BO/BH commands)
- S3-4 = ENVIR switch
  - On = Processor bug uses local (on board) memory
  - Off = Processor bug uses global (system) memory

X4048



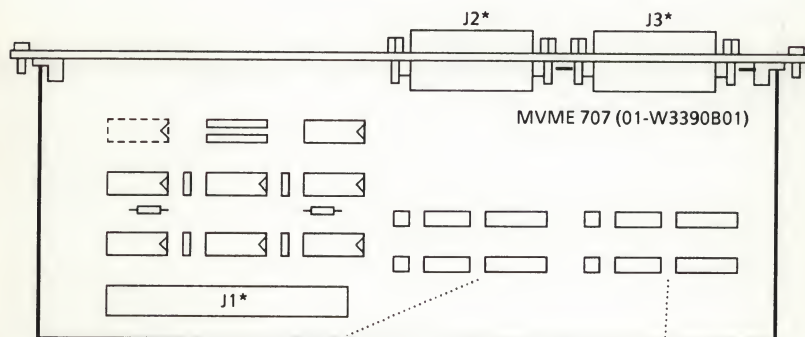
## LED's and Switches MVME131

| LED  | FUNCTION                                                                                                                                                                | ACTION                                                                                                    |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| FAIL | This LED indicates that the VMEbus SYSFAIL signal was active. This signal can be generated by every VME systembus master.                                               | Press the RESET button on the front of the processor board or use the switch at the front of the cabinet. |
| HALT | This LED indicates that the M68020 micro-processor or the M68881 co-processor is halted.                                                                                | See above.                                                                                                |
| RUN  | This LED is normally ON or flashing. If HALT is ON the RUN LED is OFF.                                                                                                  |                                                                                                           |
| SCON | This LED indicates that this processor board is the system controller. There can only be one system controller in a cabinet. Copy of the second switch of DIL switch 3. |                                                                                                           |

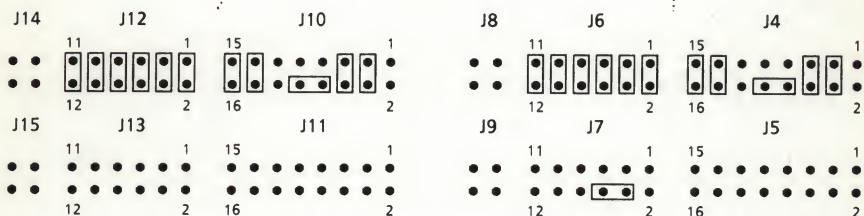
| SWITCH | FUNCTION                                                                                                                                                                                                  | ACTION                                                      |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| ABORT  | Pressing this switch causes a group 3 level 7 interrupt. This results in the display of all the 68020 registers on the console and the program control is given to 130 bug.                               | The switch must be depressed when having a software crash.  |
| RESET  | If system controller, the reset signal is supplied to the VMEbus signal SYSRESET. All controllers connected to the VMEbus are reset.<br><br>If not system controller, the result is a local reset signal. | The button must be depressed if the FAIL or HALT LED is on. |

# MVME 707

- \* **NOTE:** J1 Used for the connection to the CPU.  
 J2 Dedicated for the system console terminal, strap fields J10 to J15.  
 J3 General use. In the future dedicated for the Remote Service network, the MODEM cable is connected to strap fields J6.

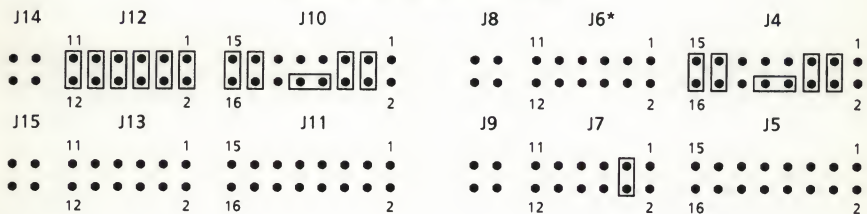


Strapsetting without MODEM



Strapsetting with MODEM

\* J6 connection for MODEM cable



X2504

## **9.2.4 Installation MVME131**

For the installation and positioning rules see Chapter 2.

## **9.2.5 Maintenance MVME131**

For the tests and the diagnostics, see chapter 3.

The CPU has a built-in self test, this test is started at power-up.

The CPU can also be tested using the 130bug debugger/diagnostics, and also via the SSID tests.

### 9.3 MVME132

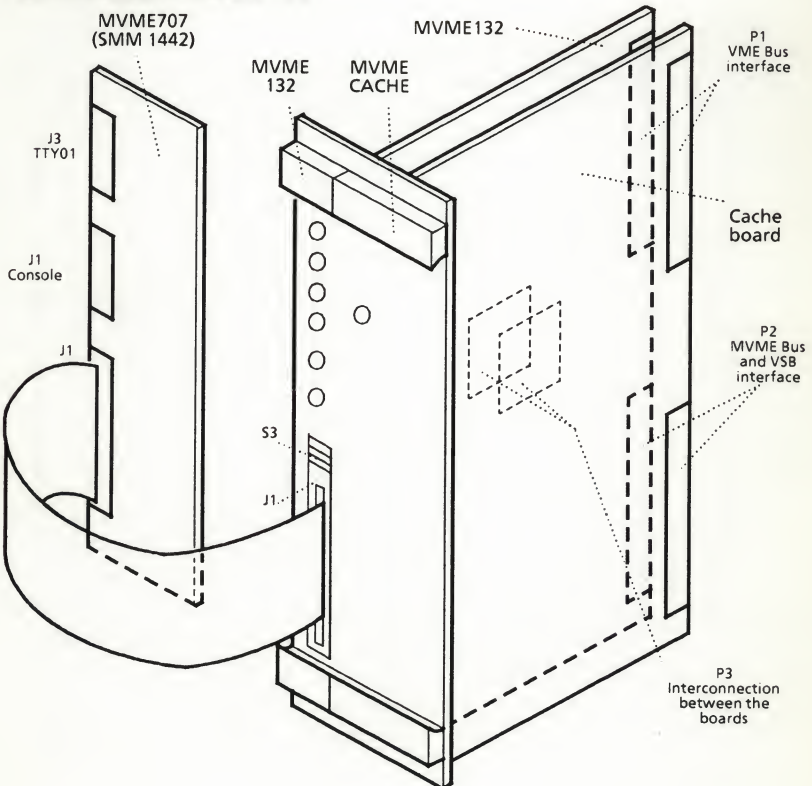
The MVME132, which is End Commercial Delivery, was available in 2 versions, namely:

- MVME132DOF, no cache memory available. Uses 1 cardslot.
- MVME132XT, cache memory available. Uses 2 cardslots.

#### 9.3.1 Characteristics MVME132

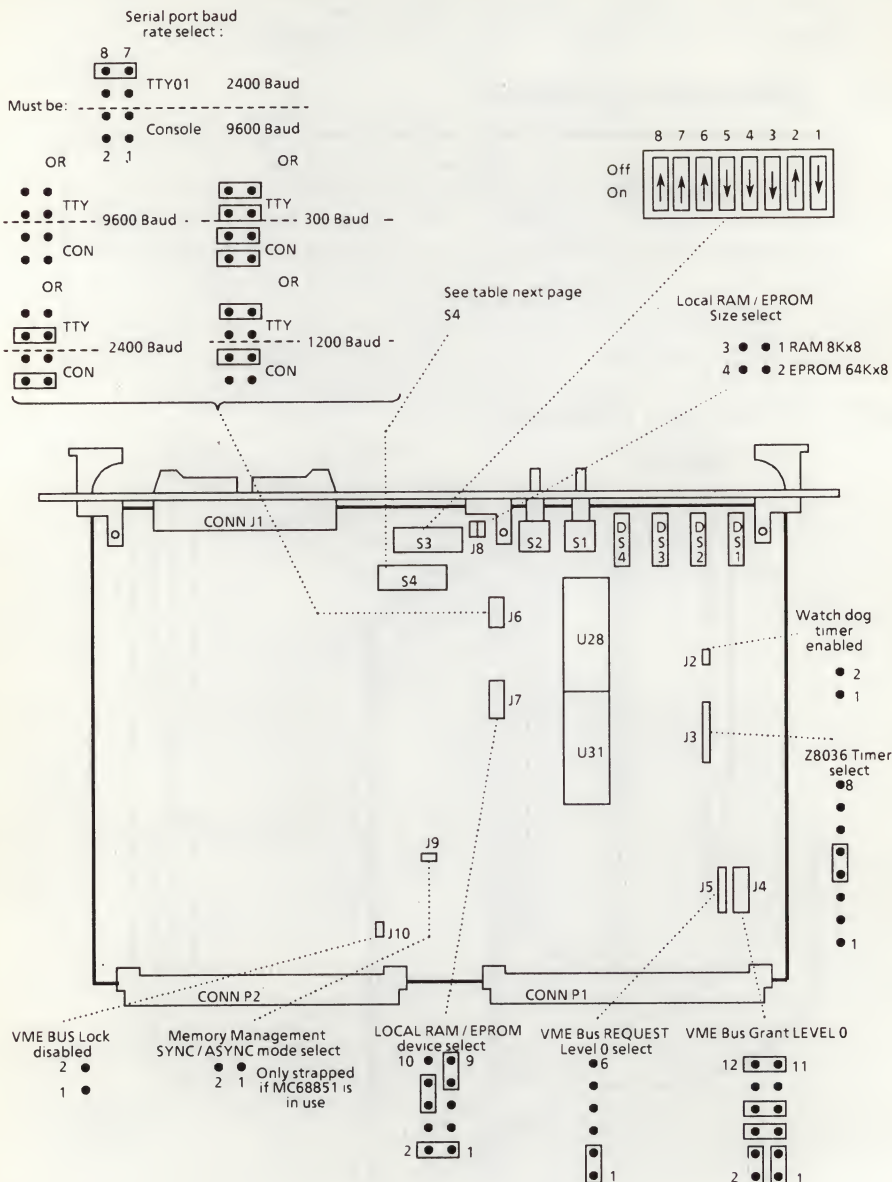
| Power Requirements | + 5 Volt |       | + 12 Volt |       | - 12 Volt |       |
|--------------------|----------|-------|-----------|-------|-----------|-------|
|                    | typ.     | max.  | typ.      | max.  | typ.      | max.  |
| MVME132XT          | 4.5 A    | 6 A   | 0         |       | 0         |       |
| MVME132CAC         | 4.3A     | 6.4A  |           |       |           |       |
| MVM707(A)          |          | .25 A |           | .25 A |           | .25 A |

#### 9.3.2 Connections MVME132





### 9.3.3 Strap Settings MVME132





## Switch Settings on MVME132

### Switch S3

| SWITCH NO. | FUNCTION                       | ON / OFF |
|------------|--------------------------------|----------|
| 1          | Operating Env.Status Bits      | Off      |
| 2          | VME bus Controller (SCON)      | On       |
| 3          | Power up Reset Vector mode     | Off      |
| 4          | Address Modifier select        | Off      |
| 5          | Hold In Reset (EXTRES)         | Off      |
| 6          | Front Panel Switch enable      | On       |
| 7          | Local / VME bus Timeout Select | On       |
| 8          | Local / VME bus Timeout Select | On       |

Note: On = 0, Off = 1

### Switch S4

| SWITCH NO. | FUNCTION                                | With MVME204-2             | With MVME205               | With MVME224               |
|------------|-----------------------------------------|----------------------------|----------------------------|----------------------------|
| 1          | VSB-bus Access Enable (see note*)       | On (VSB)                   | Off                        | On (VSB)                   |
| 2          | VISION 32 Disable                       | On                         | On                         | On                         |
| 3          | Cache Accelerator Enable                | Off (132DOF)<br>On (132XT) | Off (132DOF)<br>On (132XT) | Off (132DOF)<br>On (132XT) |
| 4          | D32 Opt. VME Data width                 | On                         | On                         | On                         |
| 5          | A32 Opt. VME Address Width (see note**) | Off                        | Off                        | Off                        |
| 6          | VSB32 bus Decode PAL Option             | On                         | On                         | On                         |
| 7          | 131 Base Address                        | On                         | On                         | On                         |
| 8          | 131 Base Address                        | On                         | On                         | On                         |

Note: On = 0, Off = 1

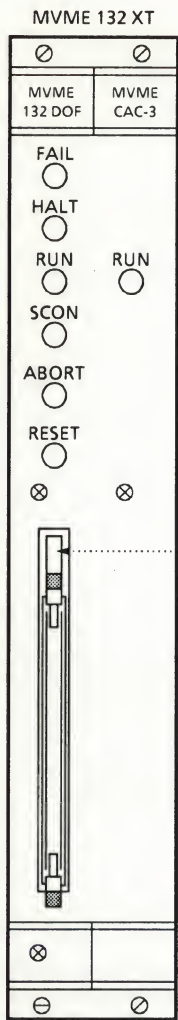
**NOTE \*** : In case of MVME2X4, VSB is in use.

**NOTE \*\*** : In case of MVME320 the board should be strapped for 24 bits address option A24. In that case the switch must be off.

\* In case of 130BUG V3.2:

- S3-1 = BOOT switch
  - On = auto boot (at power-on/reset)
  - Off = manual boot (using BO/BH commands)
- S4-3 = ENVIR switch
  - On = Processor bug uses local (on board) memory
  - Off = Processor bug uses global (system) memory

# Frontview of MVME132



In case of:  
MVME132DOF the processor module  
is 1 cardslots wide.



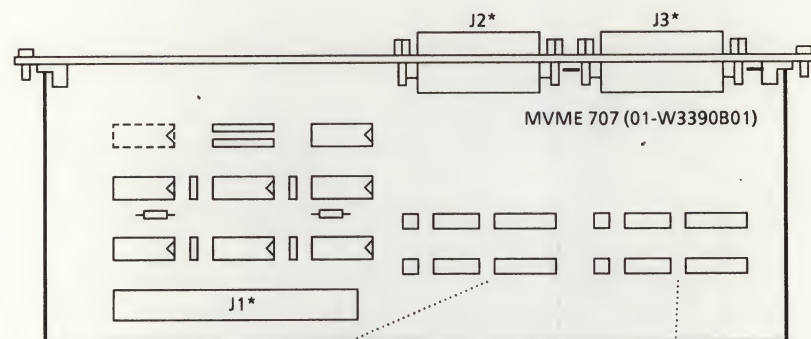
## IN CASE OF 130 BUG V3.2 :

- S3-1 = Boot switch
  - On = Autoboot (at Power-On/Reset)
  - Off = Manual boot (using BO/BH commands)
- S3-4 = ENVIR switch
  - On = Processor bug uses local (on board) memory
  - Off = Processor bug uses global (system) memory

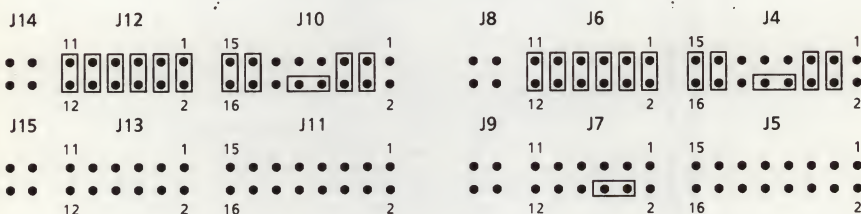


# MVME 707

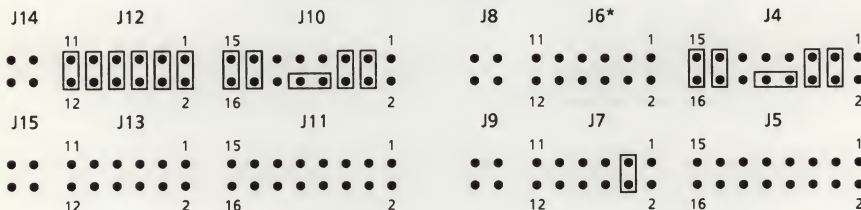
- \* **NOTE:** J1 Used for the connection to the CPU.  
 J2 Dedicated for the system console terminal, strap fields J10 to J15.  
 J3 General use. In the future dedicated for the Remote Service network, the MODEM cable is connected to strap fields J6.



Strapsetting without MODEM



strapsetting with MODEM  
 \* J6 connection for MODEM cable



X2504

## LED's and Switches MVME132XT

| LED  | FUNCTION                                                                                                                                                                | ACTION                                                                                                    |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| FAIL | This LED indicates that the VMEbus SYSFAIL signal was active. This signal can be generated by every VME systembus master.                                               | Press the RESET button on the front of the processor board or use the switch at the front of the cabinet. |
| HALT | This LED indicates that the M68020 micro-processor or the M68881 co-processor is halted.                                                                                | See above.                                                                                                |
| RUN  | This LED is normally ON or flashing. If HALT is ON the RUN LED is OFF.                                                                                                  |                                                                                                           |
| SCON | This LED indicates that this processor board is the system controller. There can only be one system controller in a cabinet. Copy of the second switch of DIL switch 3. |                                                                                                           |

| SWITCH | FUNCTION                                                                                                                                                                                                  | ACTION                                                      |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| ABORT  | Pressing this switch causes a group 3 level 7 interrupt. This results in the display of all the 68020 registers on the console and the program control is given to 130 bug.                               | The switch must be depressed when having a software crash.  |
| RESET  | If system controller, the reset signal is supplied to the VMEbus signal SYSRESET. All controllers connected to the VMEbus are reset.<br><br>If not system controller, the result is a local reset signal. | The button must be depressed if the FAIL or HALT LED is on. |

### **9.3.4 Installation MVME132**

For the installation and positioning rules see Chapter 2.

### **9.3.5 Maintenance MVME132**

For the tests and the diagnostics, see chapter 3.

The CPU has a built-in self test, this test is started at power-up.

The CPU can also be tested using the 130bug debugger/diagnostics, and also via the SSID tests.

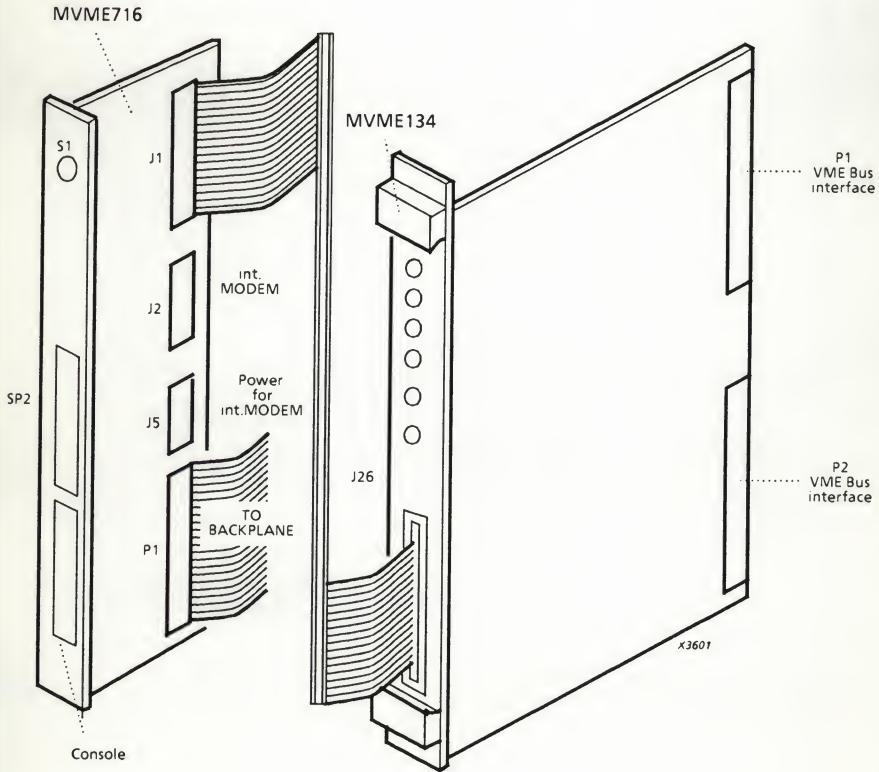
9.4 MVME134

The MVME134 processor module is only released in the P9050 cabinets.  
The MVME134 processor module is End of Commercial Delivery.

9.4.1 Characteristics

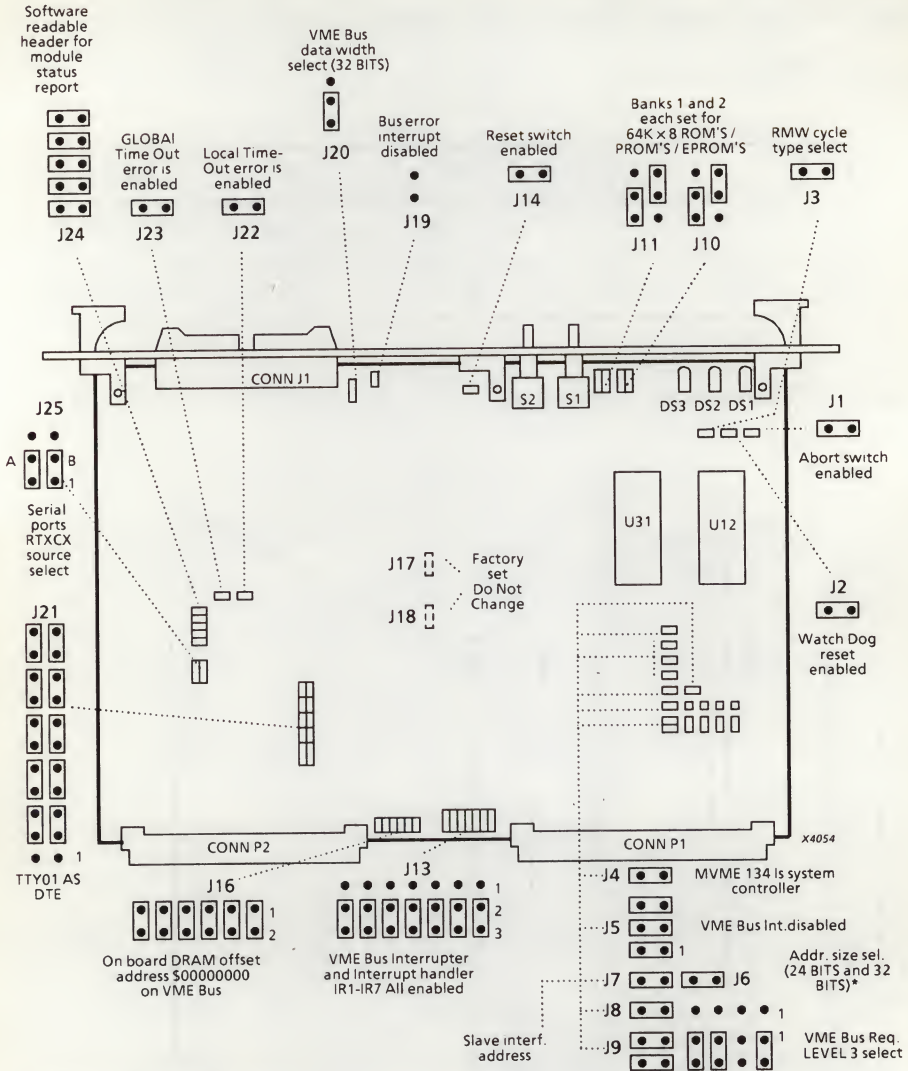
| Power Requirements | + 5V |      | + 12V |       | -12V  |       |
|--------------------|------|------|-------|-------|-------|-------|
|                    | typ. | max. | typ.  | max.  | typ.  | max.  |
| MVME134            | 5A   | 7A   | 100mA | 250mA | 100mA | 250mA |
| MVME716            | -    | -    | -     | -     | -     | -     |

9.4.2 Connections MVME134





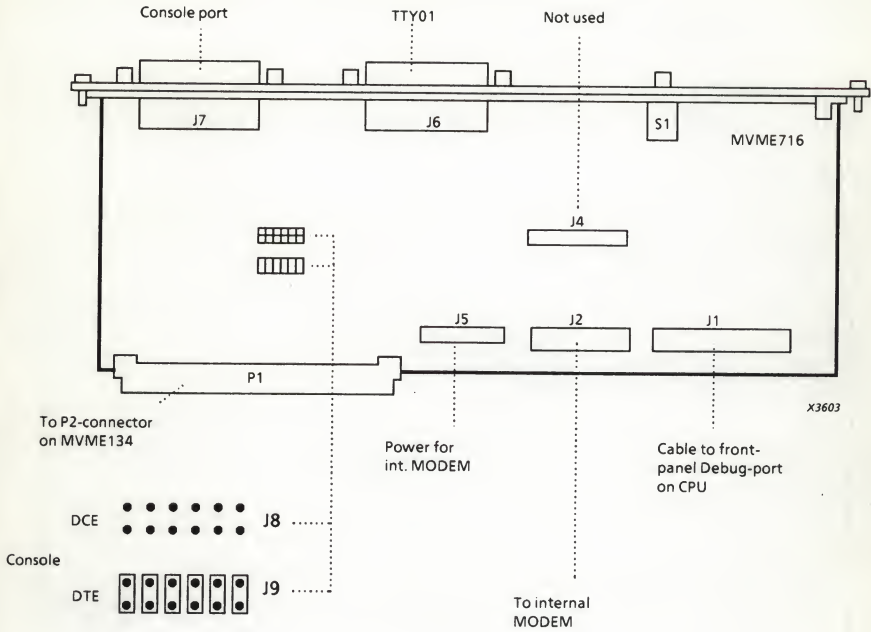
## 9.4.3 Strap Setting MVME134



NOTE: J12 AND J15 DO NOT EXIST

- \* 24 BITS IN CASE MVME 320, MVME 330 IS INSTALLED  
32 BITS IN CASE NO MVME 320 AND/OR MVME 330 IS INSTALLED

# Strap Setting MVME716



### Switches on MVME134

- Abort (S1) The abort switch is debounced and brought into the interrupt handler as a level 7 interrupt.
- Reset (S2) The front panel RESET switch resets all on board devices (including the MPU).

### Switch on MVME716

- Reset (S1) The RESET Switch resets all on board devices (including the MPU).

### LEDs on MVME134

| FAIL<br>DS1<br>RED | HALT<br>DS2<br>RED | RUN<br>DS3<br>GREEN | MVME134 STATUS                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|--------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off                | Off                | Off                 | No power is applied to the module or the MPU is not the current local bus master.                                                                                                                                                                                                                                                                                      |
| Off                | Off                | On                  | Normal operation.                                                                                                                                                                                                                                                                                                                                                      |
| Off                | On                 | Off                 | MPU is halted.                                                                                                                                                                                                                                                                                                                                                         |
| Off                | On                 | On                  | MPU is running and encountering VMEbus deadlocks and/or PMMU relinquish-and-retry. Frequency of VMEbus deadlocks and/or PMMU relinquish-and-retry determines intensity of HALT LED.                                                                                                                                                                                    |
| On                 | Off                | Off                 | MPU is not current local bus master. Also, [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME134 is system controller and SYSFAIL* is detected low on the VMEbus.                                                                                                                                               |
| On                 | Off                | On                  | [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME134 is system controller and SYSFAIL* is detected low on the VMEbus.                                                                                                                                                                                          |
| On                 | On                 | Off                 | MPU is halted and [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME134 is system controller and SYSFAIL* is detected low on the VMEbus.                                                                                                                                                                        |
| On                 | On                 | On                  | MPU is running and encountering VMEbus deadlocks and/or PMMU relinquish-and-retry. Frequency of VMEbus deadlocks and/or PMMU relinquish-and-retry determines intensity of HALT LED. Also [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME134 is system controller and SYSFAIL* is detected low on the VMEbus. |

#### 9.4.4 Installation MVME134

For the installation and positioning rules see Chapter 2.

**WARNING!!** *The VME bus arbiter of the MVME134 only arbitrates bus requests/grants on level 3. Strap all the boards in the system to that level. Except MVME332XT (see chapter 15.4-3). The MVME323, 350, 332XT, 330A/B and all MVME333 boards are not standard on level 3.*

- When MVME134 is installed the MVME350 must be at least revision level Y.

#### 9.4.5. Maintenance

For the tests and the diagnostics, see chapter 3.

The CPU has a built-in self test, this test is started at power-up.

The CPU can also be tested using the 130bug debugger/diagnostics, and also via the SSID tests.





## 9.5 MVME141

The MVME141 processor is available in some versions, namely:

- MVME141-1 Clock speed of 25MHz
- MVME141-2 Clock speed of 33MHz
- MVME141-3 Clock speed of 50MHz

The differences in the clock speed has as result that several components on the board are selected for that speed. Because of these special selected components it is not possible to upgrade or downgrade a MVME141 processor.

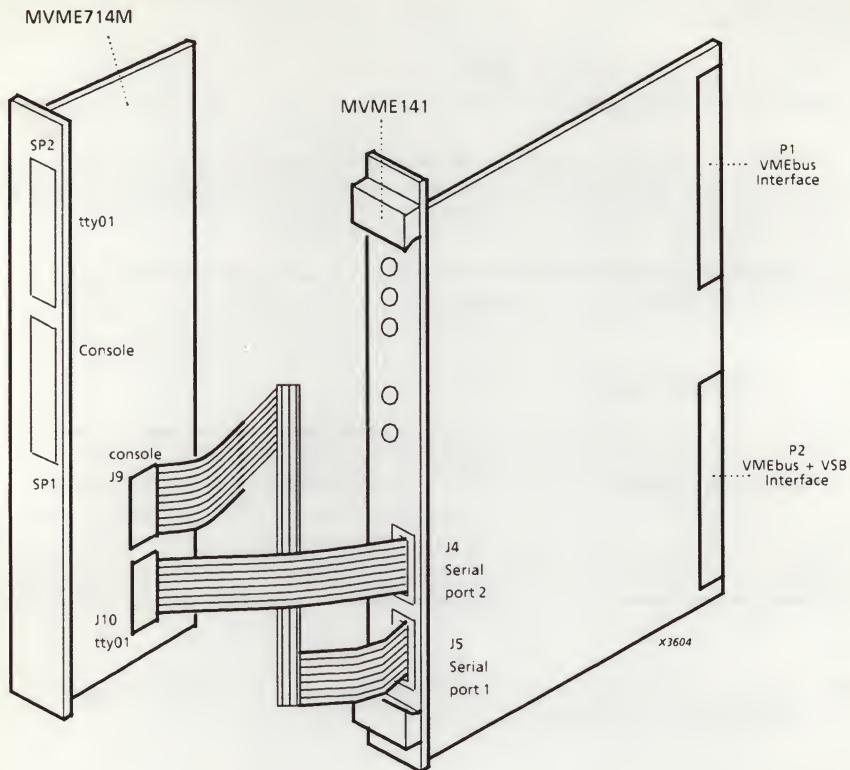
In this chapter whenever the MVME141 processor is referred to, the MVME141-1 or MVME141-2 or MVME141-3 can be referred also.

### 9.5.1 Characteristics

| Power Requirements | + 5V |      | + 12V |       | -12V |       |
|--------------------|------|------|-------|-------|------|-------|
|                    | typ. | max. | typ.  | max.  | typ. | max.  |
| MVME141            | 6.8A | 8.5A | -     | 400mA | -    | 400mA |
| MVME714M           | -    | 55mA | -     | 30mA  | -    | 30mA  |

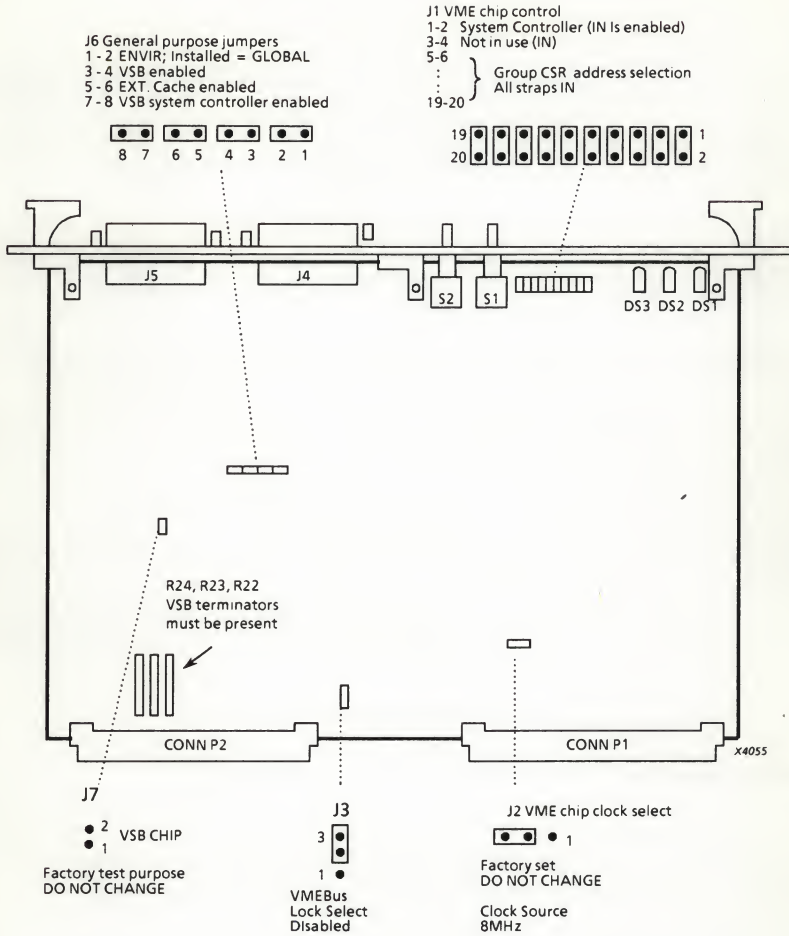
**NOTE:** *MVME714, no power consumed at +5; +12 or -12Vdc with the modem removed or not installed.*

## 9.5.2 Connections



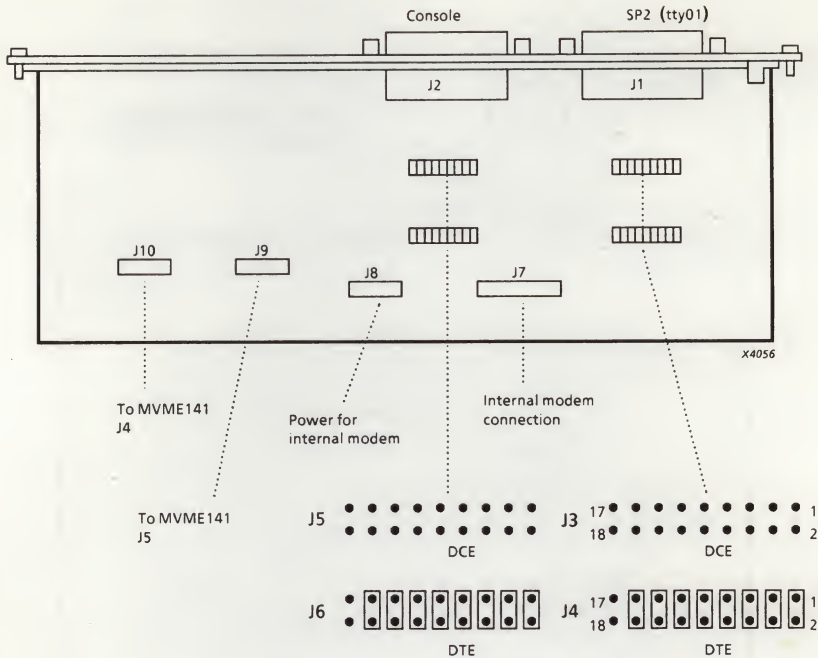
**NOTE:** For the VSB cable, see section 9.5.5.

### 9.5.3 Strap Setting MVME141





## Strap Setting MVME714M Serial Port Distr. Module



### Switches on MVME141

#### S1 Abort Switch

The abort switch is debounced and brought into the interrupt handler as a level 7 interrupt. Used to abort program execution and return to the debugger.

#### S2 Reset Switch

Generates a local reset and also generates a VMEbus reset.

**NOTE:** If non-volatile RAM is empty, press both abort and reset switch and then release first reset switch and then release abort switch, this will initialize the NVRAM.

## LED indication on MVME141

### DS1 FAIL Indicator

When lit, it indicates that the MVME141 is driving the SYSFAIL signal on the VMEbus.

### DS2 STAT Indicator

When lit, it indicates several states of the processor. It is used to indicate that the processor is halted or reset.

### DS3 RUN Indicator

When lit, it indicates that the processor is performing accesses to off-chip resources or to its on-chip cache.

In general the following operations can be roughly interpreted from RUN and STATUS LEDs:

| FAIL<br>DS1<br>RED | STATUS<br>DS2<br>YELLOW | RUN<br>DS3<br>GREEN | MVME141 STATUS                                                                                                                                          |
|--------------------|-------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off                | Off                     | Off                 | No power is applied to the module, or the MPU is not the current local bus master.                                                                      |
| Off                | Off                     | On                  | MPU is waiting for a cycle to complete.                                                                                                                 |
| Off                | On<br>(bright)          | Off                 | MPU is halted.                                                                                                                                          |
| Off                | On<br>(normal)          | Off                 | MPU is executing out of its onchip cache only.                                                                                                          |
| Off                | On                      | On                  | Normal operation.                                                                                                                                       |
| On                 | Off                     | Off                 | MPU is not current local bus master and is not executing out of onchip cache. Also [BRDFAIL] has not been cleared since reset has been set by software. |
| On                 | Off                     | On                  | [BRDFAIL] has not been cleared since reset or has been set by software. Also, MPU is waiting for a cycle to complete.                                   |
| On                 | On<br>(bright)          | Off                 | MPU is halted and [BRDFAIL] has not been cleared since reset or has been set by software.                                                               |
| On                 | On<br>(normal)          | Off                 | [BRDFAIL] has not been cleared since reset or has been set by software. Also, MPU is executing out of onchip cache only.                                |
| On                 | On                      | On                  | [BRDFAIL] has not been cleared since reset or software set [BRDFAIL].                                                                                   |

## 9.5.4 Installation

For the installation and positioning rules see Chapter 2.

### System Cautions

- The MVME141 board requires a minimum of R3V4 of V/68 with BSE-C.
- If different memory modules are used within the system, **always** place the memory modules having the largest memory capacity closest to the MVME141.
- If MVME204-2F boards are used with MVME224(A) boards, **always** place the MVME204-2F boards farthest away from the MVME141. (MVME224(A) boards will be between the MVME141 and any MVME204-2F boards). Also strapsetting MVME204-2F is important (see section 10.2.3).

## 9.5.5 Maintenance

For the tests and the diagnostics, see chapter 3.

The CPU has a built-in self test, this test is started at power-up.

The CPU can also be tested using the 141bug debugger/diagnostics, and also via the SSID tests.

## 9.6 MVME147

The MVME147 is a MC68030 based processor board with onboard memory, 4 serial ports, one parallel printer port, ethernet port, and a SCSI controller.

The MVME147 is available in several versions, namely:

- MVME147                      Clock speed of 20MHz, 4Mbyte onboard memory (ECD)
- MVME147A                  Clock speed of 20MHz, 8Mbyte onboard memory (ECD)
- MVME147-1                Clock speed of 25MHz, 4Mbyte onboard memory (ECD)
- MVME147A-1              Clock speed of 25MHz, 8Mbyte onboard memory (ECD)
- MVME147S                See section 9.7

ECD stands for End Commercial Delivery.

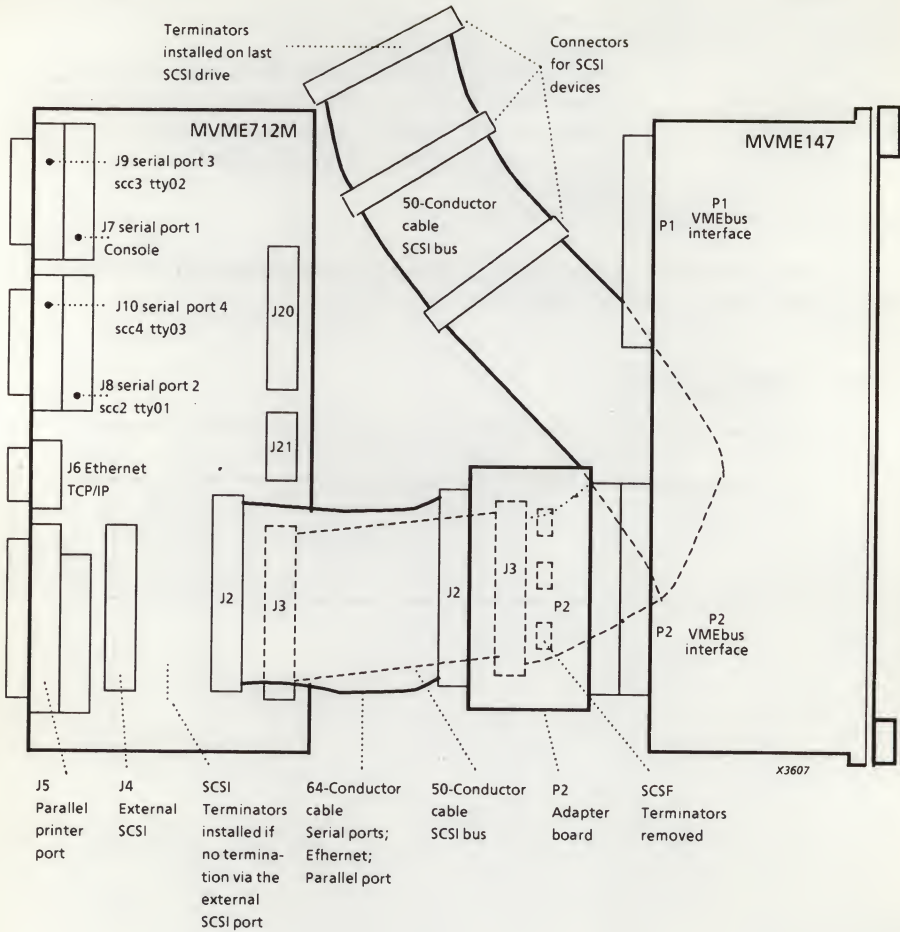
In this section whenever the MVME147 is referred to, the MVME147A or MVME147-1 or MVME147A-1 can be referred also.

### 9.6.1 Characteristics

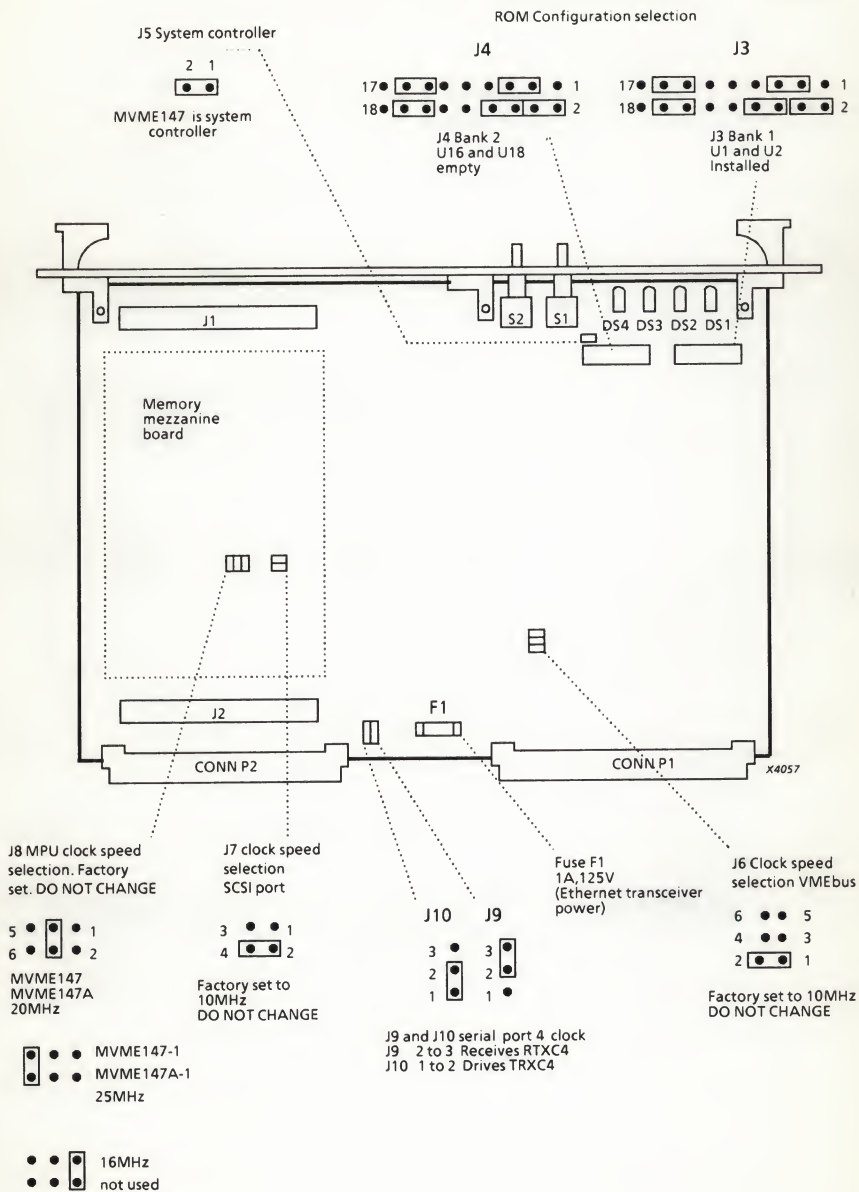
| Power Requirements |       | + 5V |      | + 12V |      | -12V |       |
|--------------------|-------|------|------|-------|------|------|-------|
|                    |       | typ. | max. | typ.  | max. | typ. | max.  |
| MVME147-(1)        | (4MB) | 6.A  | 7.A  | 0.7   | 1A   | -    | 100mA |
| MVME147A-(1)       | (8MB) | 6.A  | 7.A  | 0.7   | 1A   | -    | 100mA |



## 9.6.2 Connections

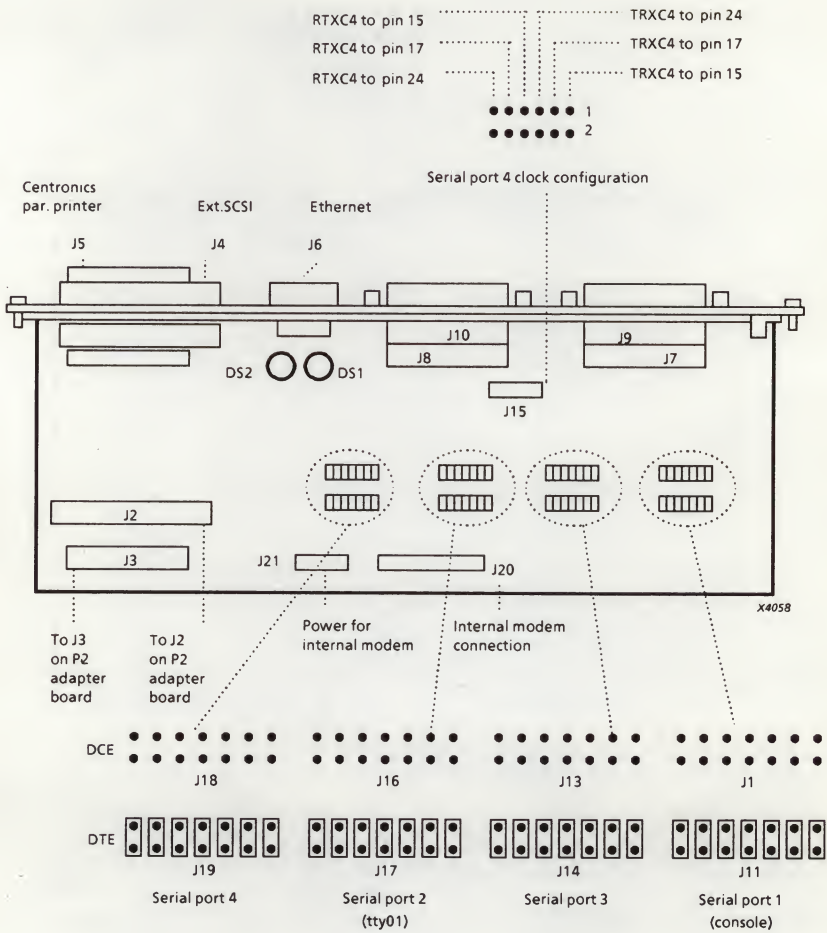


### 9.6.3 Strap Settings MVME147

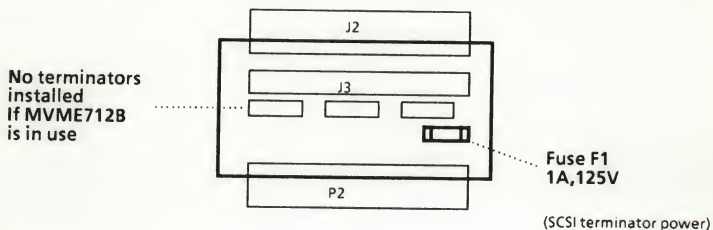


Strap Settings MVME712M

For the MVME712A and the MVME712B see section 9.7.3.



## P2 adapter



### Switches on MVME147

- Abort (S1) The abort switch is debounced and generates a level 7 interrupt. Used to abort program execution and return to the debugger.
- Reset (S2) Generates a local reset and also generates a VMEbus reset.

**NOTE:** If non-volatile RAM is empty press both abort and reset switch, then first release reset switch and then release abort switch, this will initialize the NVRAM.

### LEDs on the MVME147

- DS1 FAIL Indicator  
Indicates the status of the BRDFAIL bit. When the FAIL LED is lit the MVME147 drives SYSFAIL on the VMEbus.
- DS2 STATUS Indicator  
DS2 is lit whenever the MC68030 status pin is low.
- DS3 RUN Indicator  
Indicates, when lit, that MPU is executing a bus cycle.
- DS4 SCON Indicator  
Indicates, when lit, that the MVME147 is the VMEbus system controller.



| FAIL<br>DS1<br>RED | STATUS<br>DS2<br>YELLOW | RUN<br>DS3<br>GREEN | MVME147 STATUS                                                                                                                                                                                                                                                                                                                                                         |
|--------------------|-------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off                | Off                     | Off                 | No power is applied to the module or the MPU is not the current local bus master.                                                                                                                                                                                                                                                                                      |
| Off                | Off                     | On                  | Normal operation.                                                                                                                                                                                                                                                                                                                                                      |
| Off                | On<br>(bright)          | Off                 | MPU is halted.                                                                                                                                                                                                                                                                                                                                                         |
| Off                | On<br>(normal)          | On                  | MPU is running and encountering VMEbus deadlocks and/or PMMU relinquish-and-retry. Frequency of VMEbus deadlocks and/or PMMU relinquish-and-retry determines intensity of HALT LED.                                                                                                                                                                                    |
| Off                | On                      | On                  | MPU is not current local bus master. Also, [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME147 is system controller and SYSFAIL* is detected low on the VMEbus.                                                                                                                                               |
| On                 | Off                     | Off                 | [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME147 is system controller and SYSFAIL* is detected low on the VMEbus.                                                                                                                                                                                          |
| On                 | Off                     | On                  | MPU is halted and [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME147 is system controller and SYSFAIL* is detected low on the VMEbus.                                                                                                                                                                        |
| On                 | ON<br>(bright)          | Off                 | MPU is running and encountering VMEbus deadlocks and/or PMMU relinquish-and-retry. Frequency of VMEbus deadlocks and/or PMMU relinquish-and-retry determines intensity of HALT LED. Also [BRDFAIL] has not been cleared since reset or has been set by software. FAIL indicator is also on if MVME147 is system controller and SYSFAIL* is detected low on the VMEbus. |
| On                 | ON<br>(normal)          | Off                 | [BRDFAIL] has not been cleared since reset or has been set by software. Also, MPU is executing out of onchip cache only.                                                                                                                                                                                                                                               |
| On                 | On                      | On                  | [BRDFAIL] has not been cleared since reset or software set [BRDFAIL].                                                                                                                                                                                                                                                                                                  |

### LEDs on MVME712M

DS1 Ethernet XCVR power status.

DS2 SCSI TERM. power status.

**NOTE:** Both LEDs should be lit. If not then either a cabling problem exists, a fuse is blown, or both. (Fuse on P2 adapter is for the SCSI terminator power, fuse F1 on MVME147 is for the Ethernet transceiver power).

#### **9.6.4 Installation**

The MVME147 is allowed to be installed in the P9070, P9050 as well as in the P9030. For the installation and positioning rules see Chapter 2.

#### **9.6.5 Maintenance**

For the tests and the diagnostics, see chapter 3.

The CPU has a built-in self test, this test is started at power-up.

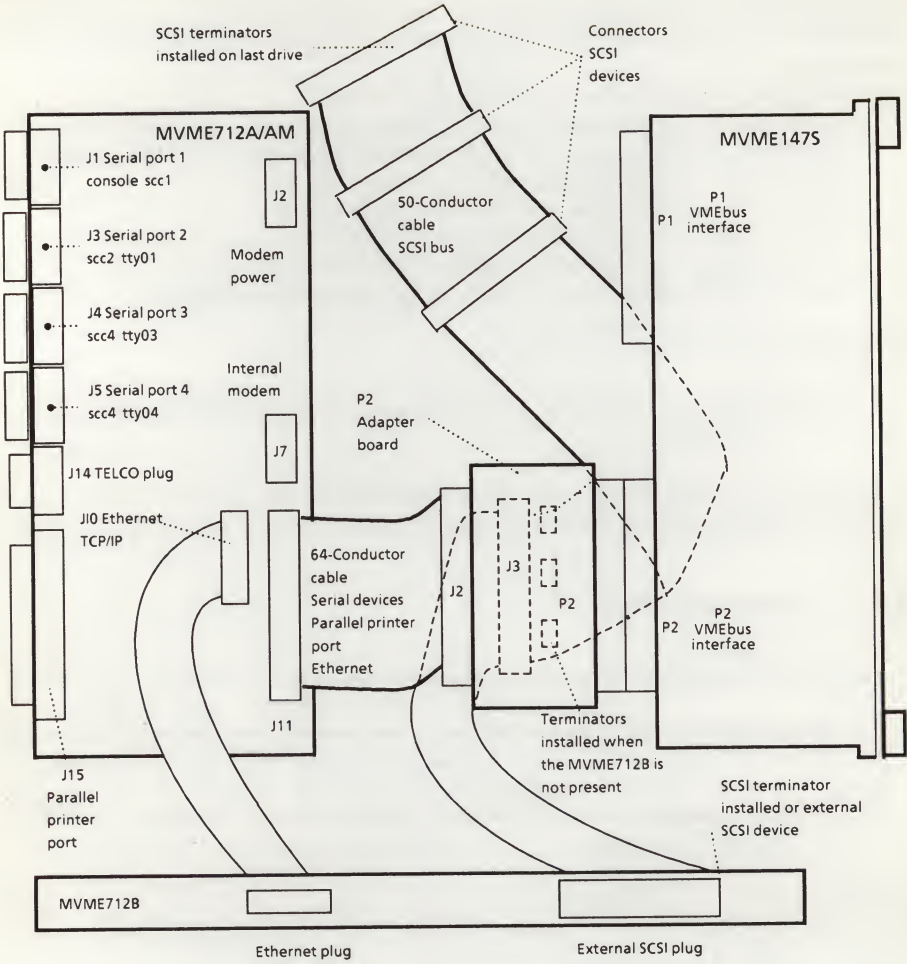
The CPU can also be tested using the 147bug debugger/diagnostics, and also via the SSID tests.



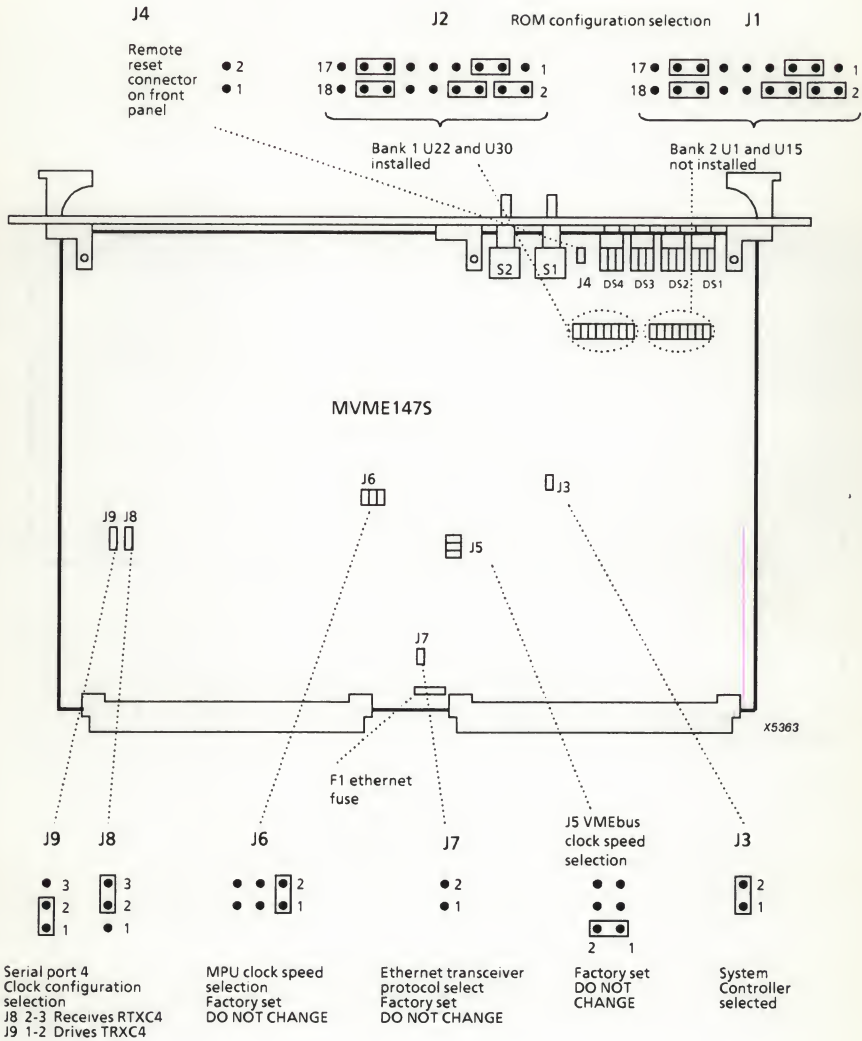




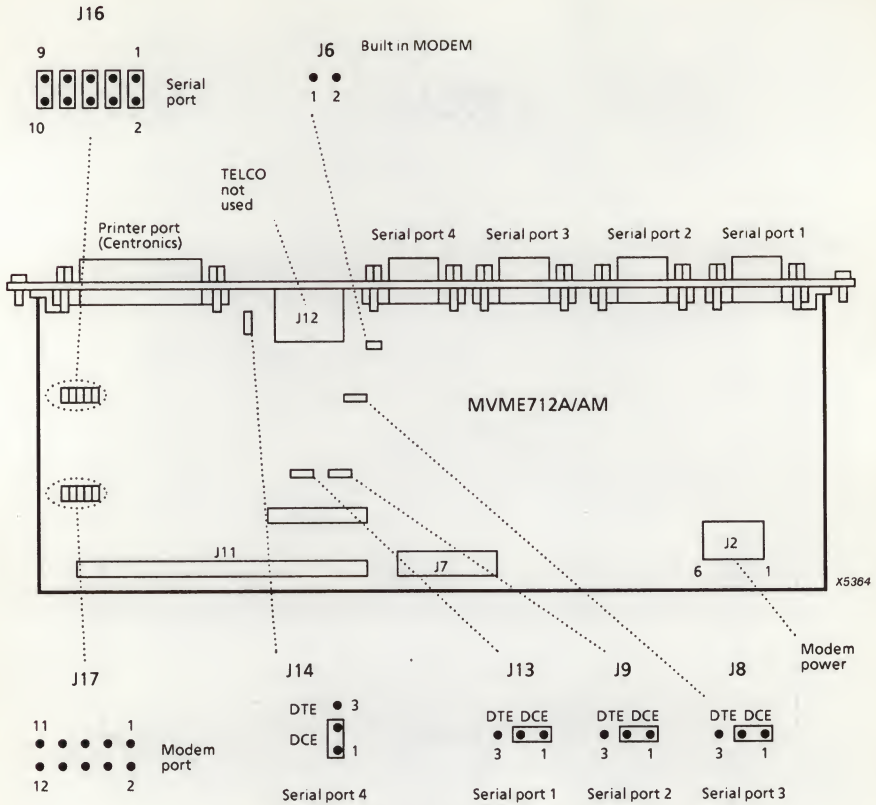
9.7.2 Connections



## 9.7.3 Strap Settings MVME147S



# Strap Settings MVME712A/AM

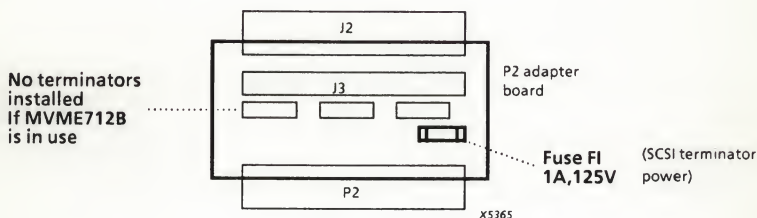


J8; J9; J13 and J14 are used for DSR pull up selection  
 1-2 DSR constant to +12V  
 2-3 DSR to ground via 4.7K

## Strap Settings MVME712B

There are no straps on the MVME712B, the MVME712B does have only two connectors on it. One for the external SCSI and one for the Ethernet (see section 9.7.2).

### P2 adapter board (paddle board)



### Switches on MVME147S

**Abort (S1)** The abort switch is debounced and generates a level 7 interrupt. Used to abort program execution and return to the debugger.

**Reset (S2)** Generates a local reset and also generates a VMEbus reset.

**NOTE:** If non-volatile RAM is empty press both abort and reset switch, then release first reset switch and then release abort switch, this will initialize the NVRAM.

### LEDs on MVME147S

#### DS1 FAIL Indicator

Indicates the status of the BRDFAIL bit. When the FAIL LED is lit the MVME147S drives SYSFAIL on the VMEbus.

#### DS2 STATUS Indicator

DS2 is lit whenever the MC68030 status pin is low.

#### DS3 Run Indicator

Indicates, when lit, that MPU is executing a bus cycle.

#### DS4 SCON Indicator

Indicates, when lit, that the MVME147S is the VMEbus system controller.

For detailed LED indication see chapter 9.8.3.

**NOTE 1:** There are no LEDs present to indicate SCSI terminator power or ethernet transceiver power.

**NOTE 2:** Fuse F1 on the P2 adapter is for the SCSI terminator power, fuse F1 on the MVME147S is for the Ethernet transceiver power.



#### **9.7.4 Installation**

The MVME147S is allowed to be installed in the P9070, P9050 as well as in the P9030. For the installation and positioning rules see Chapter 2.

#### **9.7.5 Maintenance**

For the tests and the diagnostics, see chapter 3.

The CPU has a built-in self test, this test is started at power-up.

The CPU can also be tested using the 147bug debugger/diagnostics, and also via the SSID tests.

## 9.8 MVME181

The MVME181 processor module is not released.

The MVME181 processor module is available in some versions, namely:

- MVME181-1 One MC88100 MPU, two MC88200 caches with MMU, 8Mb DRAM, 20MHz
- MVME181-2 One MC88100 MPU, two MC88200 caches with MMU, 8Mb DRAM, 25MHz

In this chapter whenever the MVME181 processor module is referred to, the MVME181-1 or MVME181-2 can be referred also.

The MVME181 occupies two card slots in the VMEbus card cage.

The first board contains the system controller, ROM, VMEbus controller and a controller for the 2 serial ports.

The second board contains 8Mbyte DRAM, the MC88100 MPU, and the two MC88200 caches with MMU.

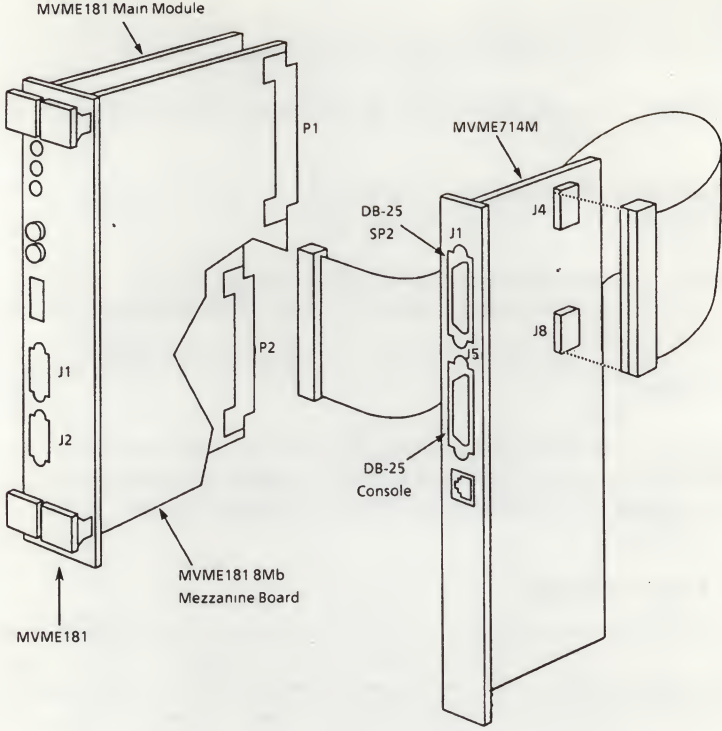
The differences in the clock speed has as result that several components on the board are selected for that speed. Because of these special selected components it is not possible to upgrade or downgrade a MVME181 processor module.

### 9.8.1 Characteristics

| Power Requirements | + 5V |      | + 12V |       | -12V  |       |
|--------------------|------|------|-------|-------|-------|-------|
|                    | typ. | max. | typ.  | max.  | typ.  | max.  |
| MVME181            | 7.0A | 8.0A | 200mA | 300mA | 200mA | 300mA |
| MVME714M           | -    | 55mA | -     | 30mA  | -     | 30mA  |

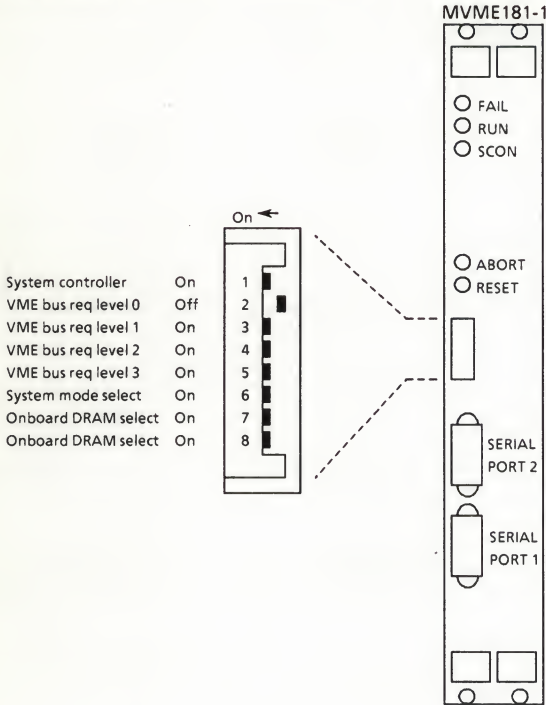
**NOTE:** *MVME714, no power consumed at +5; + 12 or -12Vdc with the modem removed or not installed.*

# 9.8.2 Connections



### 9.8.3 Strapsetting MVME181

The MVME181 does not contain straps. All strapping is done via software or via frontpanel switch S3.

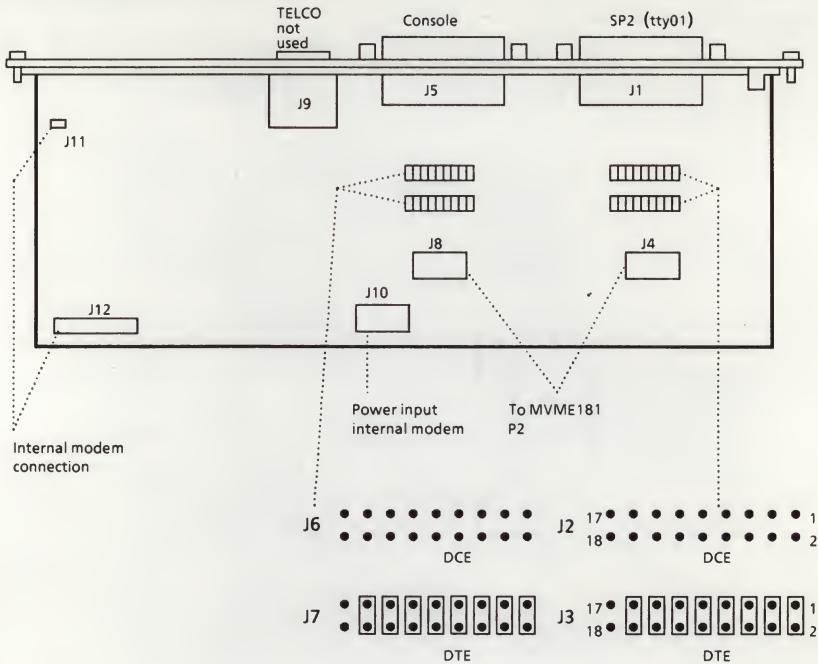


| Switch                       | Setting               | Fucntion                                                                                                                                                          |
|------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S3-1                         | On                    | MVME181 is system controller                                                                                                                                      |
| S3-2<br>S3-3<br>S3-4<br>S3-5 | Off<br>On<br>On<br>On | VME bus requester level 0 selected*<br>VME bus requester level 1 not selected<br>VME bus requester level 2 not selected<br>VME bus requester level 3 not selected |
| S3-6                         | On                    | System Status Register (SSR) bit 8 = 0. This bit is used by the MVME181 firmware to run in system mode.                                                           |
| S3-7<br>S3-8                 | On<br>On              | Select address of onboard DRAM on the VMEbus:<br>S3-7 S3-8 Address<br>On On 0000 0000 Standard<br>Off On 0080 0000<br>On Off 0100 0000<br>Off Off 0180 0000       |

\* One and only one of switch S3-2 till S3-5 must be Off.



## Strap Setting MVME714 Serial Port Distr. Module



### Switches on MVME181

#### S1 Abort Switch

The abort switch is debounced and brought into the interrupt handler as a level 7 interrupt. Used to abort program execution and return to the debugger.

#### S2 Reset Switch

Generates a local reset and also generates a VMEbus reset.

**NOTE:** If non-volatile RAM is empty, press both abort and reset switch and then release first reset switch and then release abort switch, this will initialize the NVRAM.

## LED indication on MVME181

### DS1 FAIL Indicator

This yellow LED is initially illuminated by power on or by the "reset" condition, and is turned off by the ROM-based firmware after a successful self-test. Operating software may subsequently illuminate this LED if an unrecoverable error condition is discovered.

### DS2 RUN Indicator

This green LED is lit, to indicate that onboard devices (local ROM or SRAM, etc) are accessed. It extinguishes if these devices are not accessed anymore for a period of approximately 2 msec, but relights if a subsequent access occurs.

### DS3 SCON Indicator

This green LED is illuminated if the MVME181 is configured as the system controller, which is when S3-1 is ON.

## 9.8.4 Installation

The MVME181 processor module requires a minimum of R3.2 Version 1.1 of V/88. If different memory module sizes are used within the system, **always** place the memory modules having the largest memory capacity closest to the MVME181.

For the installation and positioning rules see Chapter 2.

## 9.8.5 Maintenance

For the tests and the diagnostics, see chapter 3.

The MVME181 has a built-in self test, this test is executed at power on.

The MVME181 can be tested using the MVME181 debugger and also via the SSID tests.



## 9.9 MVME187

The MVME187 is a Single, 25MHz MC88100 based RISC Processor module with onboard memory, 4 serial ports, one parallel printer port, ethernet port, and a SCSI adapter.

The MVME187 is available in several versions, namely:

- MVME187      4Mbyte memory      Not released
- MVME187A    8Mbyte memory      Not released
- MVME187B    16Mbyte memory
- MVME187C    32Mbyte memory

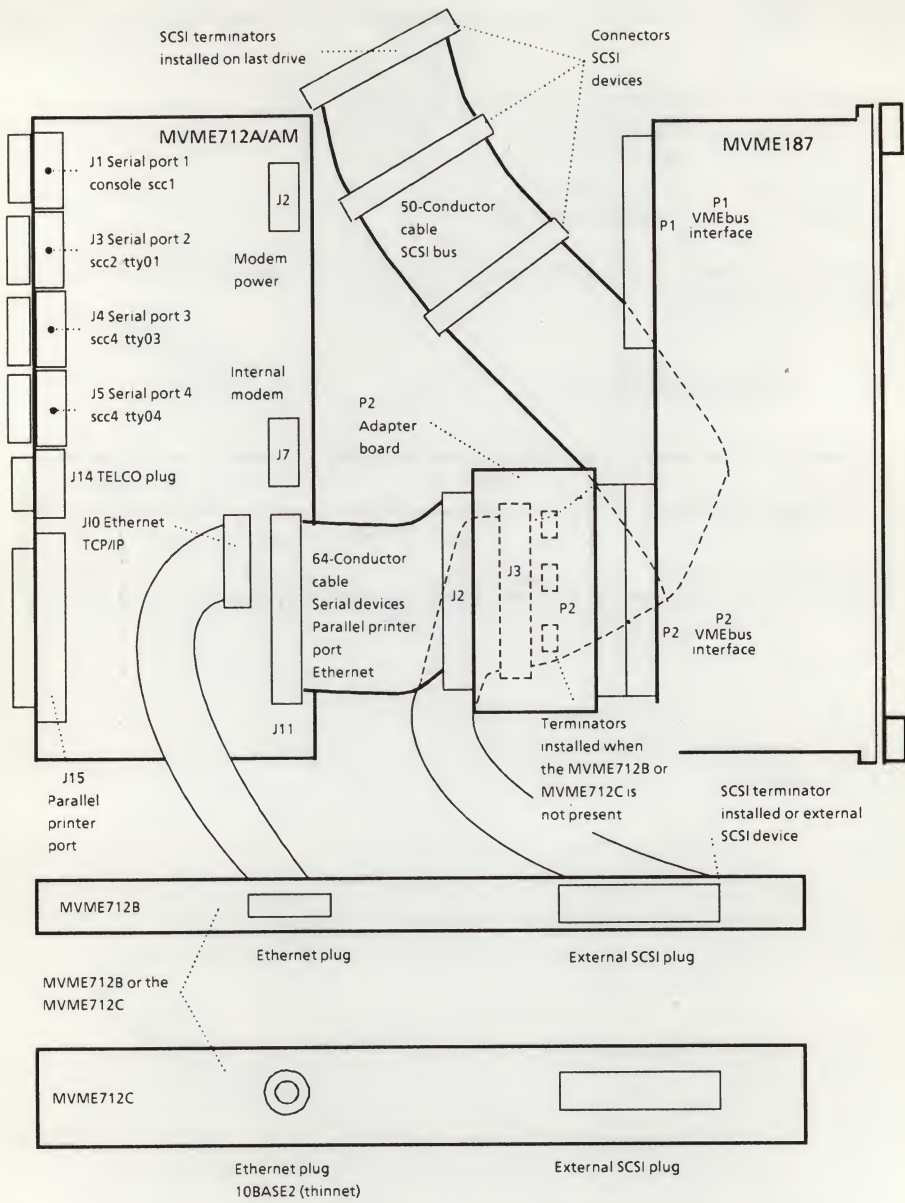
In this chapter whenever the MVME187 is referred to, all other MVME187x processor boards can be referred.

### 9.9.1 Characteristics

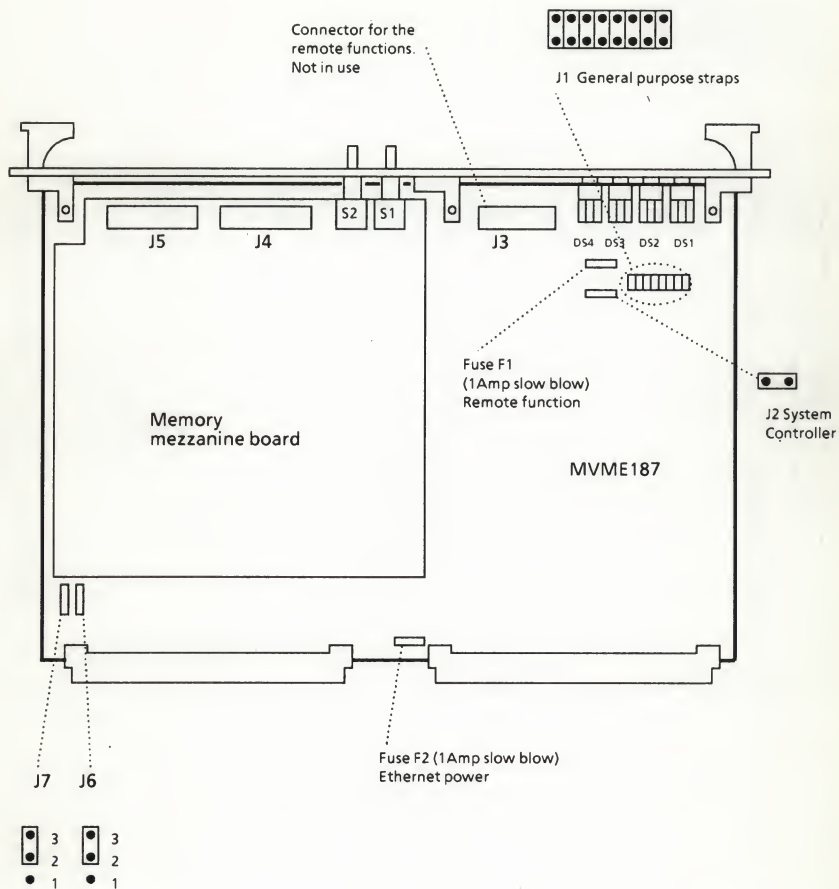
| Power Requirements     | + 5V |      | + 12V |      | -12V |       |
|------------------------|------|------|-------|------|------|-------|
|                        | typ. | max. | typ.  | max. | typ. | max.  |
| MVME187 (with 32Mbyte) | 3.5A | 4.5A | -     | 1.0A | -    | 100mA |



9.9.2 Connections



### 9.9.3 Strap Settings

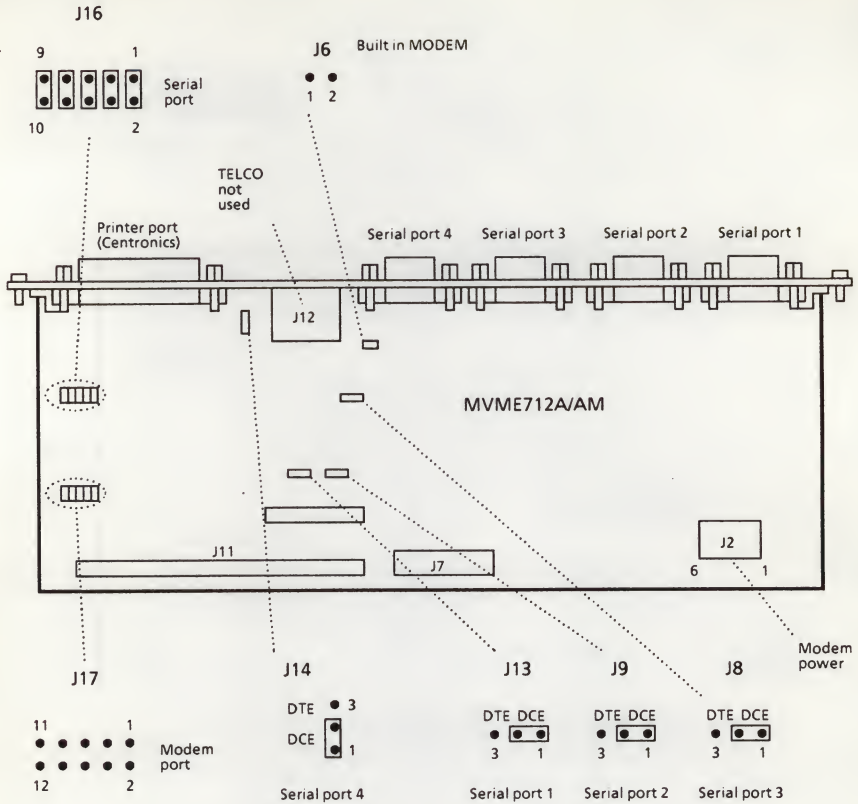


Serial port 4 Clock configuration selection.

J6 2-3 Receives RTXC4

J7 2-3 Receives TRXC4

# Strap Settings MVME712A/AM



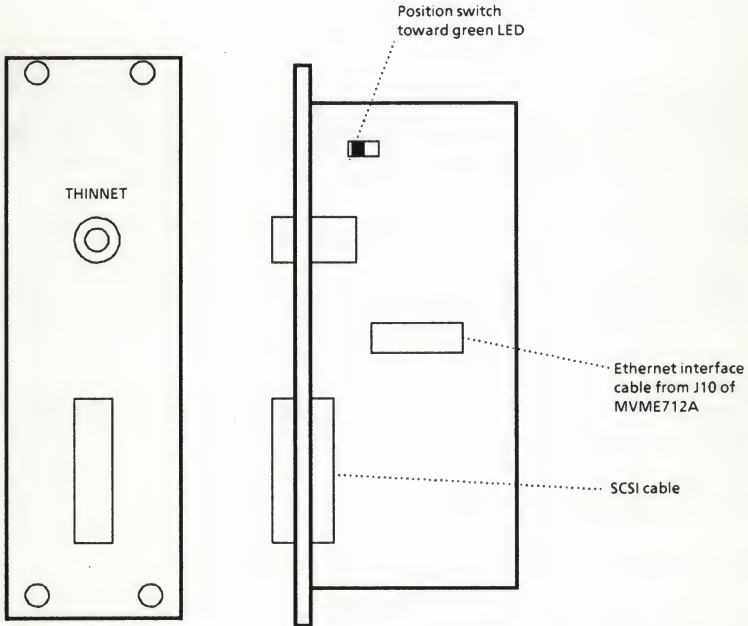
J8; J9; J13 and J14 are used for DSR  
pull up selection  
1-2 DSR constant to + 12V  
2-3 DSR to ground via 4.7K

## Strap Settings MVME712B

There are no straps on the MVME712B, the MVME712B does have only two connectors on it. One for the external SCSI and one for the Ethernet (see section 9.9.2).

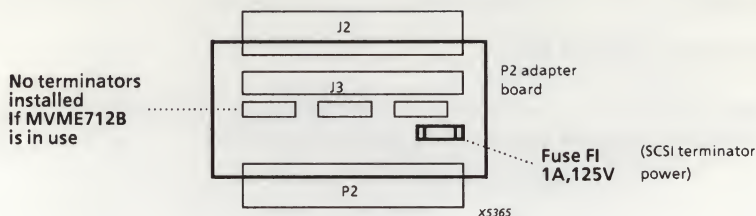
## Strap Settings MVME712C

The MVME712C can be used instead of the MVME712B. The MVME712C contains a thinnet transceiver and the external SCSI interface connector.





## P2 adapter board (paddle board)



### Switches on MVME187

**Abort (S1)** The abort switch is debounced and generates a level 7 interrupt. Used to abort program execution and return to the debugger.

**Reset (S2)** Generates a local reset and also generates a VMEbus reset.

**NOTE:** If non-volatile RAM is empty press both abort and reset switch, then release first reset switch and then release abort switch, this will initialize the NVRAM.

### LEDs on MVME187

**DS1** Red FAIL LED. Indicates the status of the BRDFAIL bit. When the FAIL LED is lit the MVME187 drives SYSFAIL on the VMEbus.

Yellow STAT (status) LED. Is controlled by the MVME187

**DS2** Green RUN LED is lit when the local bus TIP\* signal line is low.

Green SCON LED is lit when the VMEchip on the MVME187 is in the VMEbus system controller mode. Controlled by jumper J2.

**DS3** Green LAN LED, lights when the Network chip is local bus master.

Green 12V LAN Power LED, lights when 12V power is available to the transceiver interface.

**DS4** Green SCSI LED, lights when the SCSI chip is the local bus master.

Green VME LED, lights when the MVME187 is using the VMEbus or when it is accessed by the VMEbus.

#### **9.9.4 Installation**

The MVME187 is allowed to be installed in the P9035 and in the P9045.  
For the installation and positioning rules see Chapter 2.

#### **9.9.5 Maintenance**

For the tests and the diagnostics, see chapter 3.  
The CPU has a built-in self test, this test is started at power-up.

The CPU can also be tested using the 187bug debugger/diagnostics, and also via the SSID tests.



## 9.10 MVME188

The MVME188 processor module is available in two versions, the 'old' MVME188 RISC Processor module and the new MVME188A RISC Processor module. Both MVME188 versions are only released in the 25MHz version.

The 'old' MVME188 is End Commercial Delivery.

The MVME188A RISC Processor module is fully downwards compatible with the 'old' MVME188. The separate boards of the MVME188A are **not** compatible with the ones of the MVME188, except for the new memory boards.

The MVME188 and MVME188A are Field Replaceable Units, the strap and switch setting for both boards are the same.

An MVME188 or MVME188A RISC Processor module consists of the following items:

- MVME188 SYSCON      System controller board (first board), or the
- MVME188A SYSCON    System controller board
- MVME288D-16        16Mbyte memory module, only for the MVME188, 1 through max 4 memory boards are allowed
- MVME288D-64        64Mbyte memory module, only for the MVME188
- MVME288-16         16Mbyte memory module
- MVME288-64         64Mbyte memory module
- MVME188A CPU        CPU board, also called the Main Logic Board (last board)
- HM88K Hyper         Hyper module on the CPU board

The MVME188 processor module occupies three till six card slots in the VMEbus card cage.

The first board contains the system controller functions, 128Kb SRAM, ROM, VMEbus controller, a controller for 2 serial ports and 3 LEDs.

The second till one but last board contains the global memory. This are the MVME288 memory modules. The MVME288 is described in chapter 10. At most 4 MVME288 memory modules are allowed.

The last board is the Main Logic or CPU board, with on top of it the HYPER module mezzanine board containing the MC88100 and MC88200 or MC88204 chips.

In this chapter whenever the MVME188 processor is referred to, any of the MVME188 or MVME188A modules can be referred also.

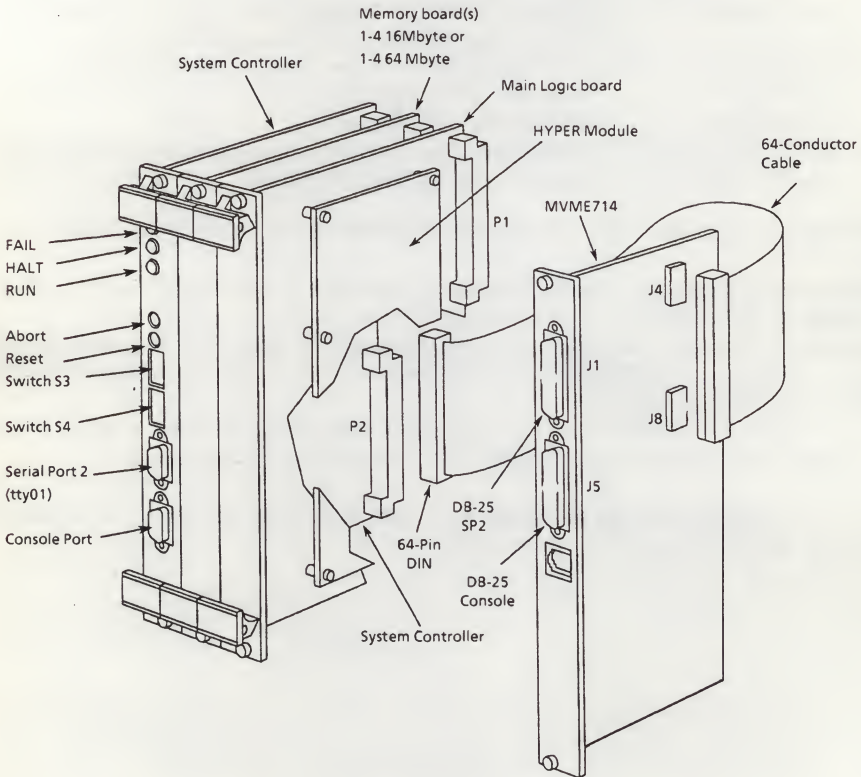


### 9.10.1 Characteristics

| Power Requirements | + 5V  |       | + 12V |      | -12V |      |
|--------------------|-------|-------|-------|------|------|------|
|                    | typ.  | max.  | typ.  | max. | typ. | max. |
| MVME188            | 14.5A | 18.0A | 16mA  | 20mA | 16mA | 20mA |
| MVME714M           | -     | 55mA  | -     | 30mA | -    | 30mA |

**NOTE:** MVME714, no power consumed at +5; +12 or -12Vdc with the modem removed or not installed.

### 9.10.2 Connections

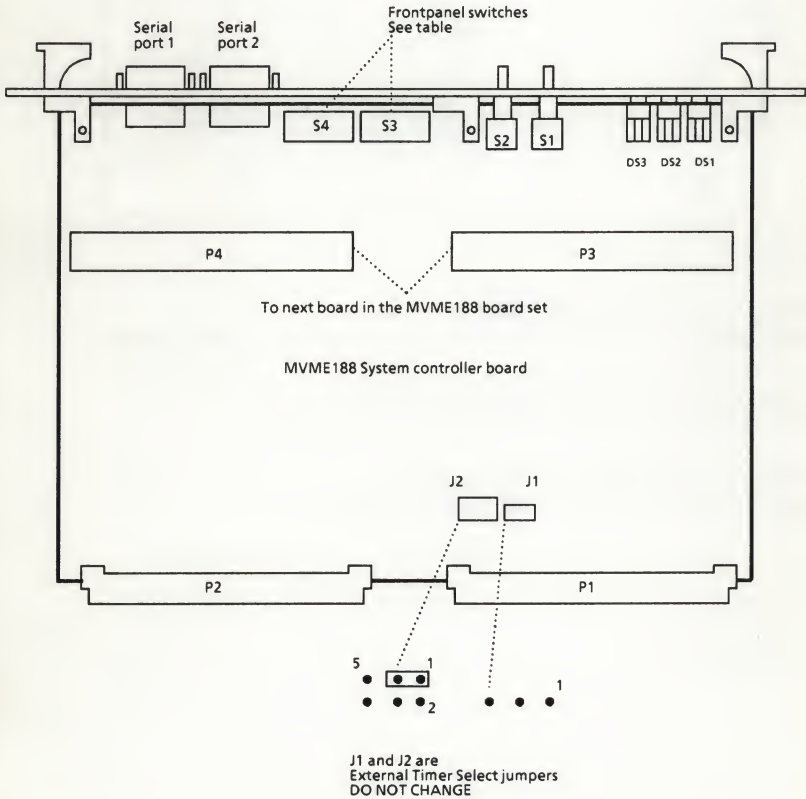


Each board in the MVME188 board set is connected to the other boards via two connectors, the P3 and P4 connectors.

On the MVME188 Main Logic board there are the connectors (J1, J2, and J3) used to connect the MVME188 HYPER Module to the MVME188 board set.

9.10.3 Strap Setting

Strap Setting for the MVME188 System Controller Board



| Switch                       | Setting                | Fucntion                                                                                                                                                                                                             |
|------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S3-1                         | On                     | MVME188 is system controller                                                                                                                                                                                         |
| S3-2<br>S3-3<br>S3-4         | On<br>On<br>On         | Z8536 CIO pin PB3 grounded (ENV0)<br>Z8536 CIO pin PB4 grounded (ENV1)<br>Z8536 CIO pin PB5 grounded (ENV2)<br>These pins are used as software switches by the 188Bug.<br>If the switches ar on, they read as a "0". |
| S3-5<br>S3-6<br>S3-7<br>S3-8 | Off<br>Off<br>On<br>On | Global Control and Status Register (GCSR) address in VMEbus short I/O space, which must be \$C800. These four switches decode bit 15-12 (\$C)<br>If a switch is on, it reads as a "0".                               |
| S4-1<br>S4-2<br>S4-3<br>S4-4 | Off<br>On<br>On<br>On  | Global Control and Status Register (GCSR) address in VMEbus short I/O space, which must be \$C800. These four switches decode bit 11-8 (\$8)<br>If a switch is on, it reads as a "0".                                |
| S4-5<br>S4-6<br>S4-7<br>S4-8 | On<br>On<br>On<br>On   | Global Control and Status Register (GCSR) address in VMEbus short I/O space, which must be \$C800. These four switches decode bit 7-4 (\$0)<br>If a switch is on, it reads as a "0".                                 |

#### Strap Setting for the MVME288D Memory Board

For the strapping of the MVME188 memory, the MVME288, see the chapter 10.

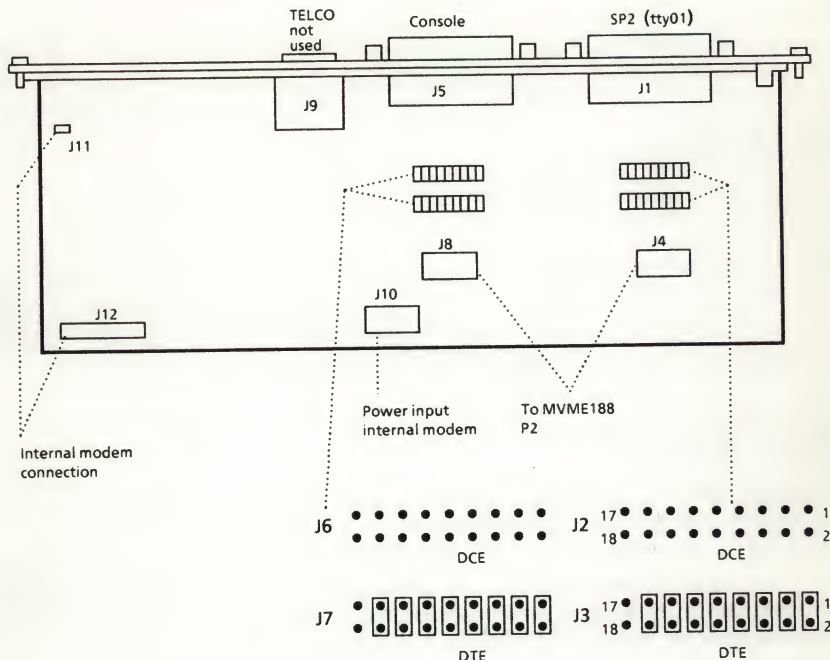
#### Strap Setting for the MVME188 Main Logic Board

The MVME188 Main Logic Board does not have any strapping.

#### Strap Setting for the HM88K HYPER module

The HM88K HYPER module does not have any strapping

## Strap Setting MVME714 Serial Port Distr. Module



### Switches on MVME188 processor module

The switches of the MVME188 processor module are on the MVME188 System Controller Board.

#### S1 Abort Switch

The abort switch is debounced and brought into the interrupt handler as a level 7 interrupt. Used to abort program execution and return to the debugger.

#### S2 Reset Switch

Generates a local reset and also generates a VMEbus reset.

**NOTE:** If non-volatile RAM is empty, press both abort and reset switch and then release first reset switch and then release abort switch, this will initialize the NVRAM.



## **LED indication on MVME188 processor module**

The LEDs of the MVME188 processor module are on the MVME188 System Controller Board.

### **DS1 FAIL Indicator**

This yellow LED is initially illuminated by power on or by the "reset" condition, and is turned off by the ROM-based firmware after a successful self-test. Operating software may subsequently illuminate this LED if an unrecoverable error condition is discovered.

### **DS2 HALT Indicator**

Either one of two resources illuminate the yellow HALT LED: a local reset or a system reset.

### **DS3 RUN Indicator**

This green LED is illuminated on any access of local memory (DRAM) or system controller board resources (ROM, SRAM, etc), that is, whenever any device is being accessed on the local MVME188 bus. It is also lit whenever the MVME188 processor module accesses the VMEbus.

## **9.10.4 Installation**

The MVME188 processor module requires a minimum of R3.2 Version 1.1 of V/88

The MVME188 processor module is a heavy module, handle it with care. When sliding in the processor module into the card slots of the card cage line the processor up in the connectors and apply pressure until a firm connection is felt. Tighten the top and bottom screws crosswise. Push the processor module again firmly into the cardslot and tighten the screws again.

For the installation and positioning rules see Chapter 2.

## **9.10.5 Maintenance**

For the tests and the diagnostics, see chapter 3.

The MVME188 has a built-in self test, this test is executed at power on.

The MVME188 can be tested using the MVME188 debugger and also via the SSID tests.

## 10 MEMORIES

Section:

Page:

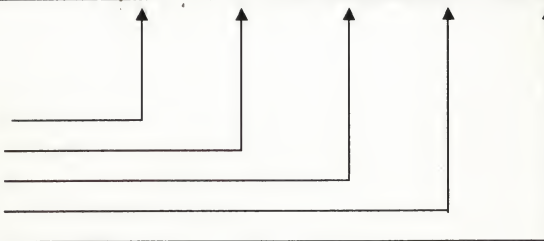
|                        |        |
|------------------------|--------|
| 1: General Information | 10.1.1 |
|------------------------|--------|

|                                             |        |
|---------------------------------------------|--------|
| 1.1 Technical Data                          | 10.1-1 |
| 1.2 Combining MVME224 and MVME204-2F Boards | 10.1-2 |
| 1.3 Limitations on Amount of System Memory  | 10.1-4 |
| 1.4 Configuring the System Memory           | 10.1-4 |
| 1.5 MVME134/MVME147 Offboard Memory         | 10.1-5 |

|               |        |        |        |        |        |
|---------------|--------|--------|--------|--------|--------|
| 2: MVME204-2F | 10.2-1 | 10.2-1 | 10.2-2 | 10.2-4 | 10.2-4 |
| 3: MVME205    | 10.3-1 | 10.3-1 | 10.3-2 | 10.3-4 | 10.3-4 |
| 4: MVME224-2  | 10.4-1 | 10.4-1 | 10.4-2 | 10.4-4 | 10.4-4 |
| 5: MVME224A-x | 10.5-1 | 10.5-1 | 10.5-2 | 10.5-4 | 10.5-4 |
| 6: MVME236-x  | 10.6-1 | 10.6-1 | 10.6-2 | 10.6-4 | 10.6-4 |
| 7: MVME288    | 10.7-1 | 10.7-1 | 10.7-2 | 10.7-3 | 10.7-3 |

Subsection:

- 1 Characteristics
- 2 Connections
- 3 Strap Settings
- 4 Installation
- 5 Maintenance





## 10.1 GENERAL INFORMATION

### 10.1.1 Technical Data

|                  | MVME<br>204-2F | MVME<br>205               | MVME<br>224-2 | MVME<br>224A-2 | MVME<br>224A-3 | MVME<br>224A-4 |
|------------------|----------------|---------------------------|---------------|----------------|----------------|----------------|
| Capacity         | 2M bytes       | 4Mbytes                   | 8Mbytes       | 8Mbytes        | 16Mbytes       | 32Mbytes       |
| Error Detection  | Byte Parity    | Single- and<br>double bit | Byte Parity   | Byte Parity    | Byte Parity    | Byte Parity    |
| Error Correction | No             | Single<br>bit error       | No            | No             | No             | No             |
| Interleaving     | Yes            | No                        | No            | Yes            | Yes            | Yes            |
| Cycle time       |                |                           |               |                |                |                |
| Read cycle       | 280ns          | 450ns                     | 220ns         | 200ns          | 200ns          | 200ns          |
| Write cycle      | 280ns          | 300ns                     | 220ns         | 200ns          | 200ns          | 200ns          |
| Dual Ported      | Yes            | No                        | Yes           | Yes            | Yes            | Yes            |
| Power +5V        |                |                           |               |                |                |                |
| Typ              |                | 2.4A                      | 3.9A          | 3.9A           | 3.9A           | 4.5A           |
| Max              | 5.0A           | 2.8A                      | 5.0A          | 5.0A           | 5.0A           | 5.0A           |

#### Remarks:

- All boards can be tested via the processor bug and via SSID
- The MVME224-1 (4Mbyte) is not released
- The MVME224-2 is replaced by the MVME224A-2
- The MVME224A-1 (4Mbyte) is not released

|                  | MVME<br>236-2 | MVME<br>236-3 | MVME<br>288-16 | MVME<br>288-64 |
|------------------|---------------|---------------|----------------|----------------|
| Capacity         | 8Mbytes       | 16Mbytes      | 16Mbytes       | 64Mbytes       |
| Error Detection  | Byte Parity   | Byte Parity   | Byte Parity    | Byte Parity    |
| Error Correction | No            | No            | No             | No             |
| Interleaving     | No            | No            | No             | No             |
| Cycle time       |               |               |                |                |
| Read cycle       | 200ns         | 200ns         | 200ns          | 200ns          |
| Write cycle      | 200ns         | 200ns         | 200ns          | 200ns          |
| Dual Ported      | No            | No            | No             | No             |
| Power +5V        |               |               |                |                |
| Typ              | 3.9A          | 3.9A          | ?              | ?              |
| Max              | ?             | ?             | ?              | ?              |

#### Remarks:

- The MVME236-2/3 are the memory modules used in combination with the MVME181 RISC processor module. Not released.
- The MVME288 memory modules are used in combination with and are a part of the MVME188 RISC processor module.



## 10.1.2 Combining MVME224 and MVME204-2F Boards

If MVME224A, MVME224 memory boards are combined with MVME204-2F boards there are some points of interest:

- Memory boards with the largest memory capacity must have the lowest start address.
- Memory boards with the largest memory capacity must be installed first, next to the processor module.
- The CSR address of the MVME224A and the MVME224 boards is directly coupled to the start address of the memory range for that board. The lowest address for the CSR is FFFFBE01, see also section 10.4 and 10.5.

The result is that the MVME204-2F cannot use anymore this CSR address. For this reason the MVME204-2F must use non standard CSR addresses, see next table.

The VMEbus and VSB start addresses of the memory combinations possible with the MVME224A, MVME224 and MVME204-2F are given in the following table. The address range in the table does run from 0 to 64Mbyte.

**NOTE:** *It makes no difference when using a MVME224A-2 or a MVME224-2, both boards do need the same strapping. In case of a MVME224A-3 the only difference is the memory capacity, so in that case the start address of the next board is 16Mbyte further.*

| Start<br>address<br><br>(dec) | VME/VS<br>start<br>address<br><br>(hex) | M<br>VMEbus |   |   |   |
|-------------------------------|-----------------------------------------|-------------|---|---|---|
|                               |                                         | S2          |   |   |   |
|                               |                                         | 4           | 3 | 2 | 1 |
| 0 Mb                          | 0000 0000                               | 0           | 0 | 0 | 0 |
| 4 Mb                          | 0040 0000                               | 0           | 0 | 0 | 0 |
| 8 Mb                          | 0080 0000                               | 0           | 0 | 0 | 0 |
|                               | 00A0 0000                               |             |   |   |   |
| 12 Mb                         | 00C0 0000                               | 0           | 0 | 0 | 0 |
|                               | 00E0 0000                               |             |   |   |   |
| 16 Mb                         | 0100 0000                               | 0           | 0 | 0 | 0 |
|                               | 0120 0000                               |             |   |   |   |
| 20 Mb                         | 0140 0000                               | 0           | 0 | 0 | 0 |
|                               | 0160 0000                               |             |   |   |   |
| 24 Mb                         | 0180 0000                               | 0           | 0 | 0 | 0 |
|                               | 01A0 0000                               |             |   |   |   |
| 28 Mb                         | 01C0 0000                               | 0           | 0 | 0 | 0 |
|                               | 01E0 0000                               |             |   |   |   |
| 32 Mb                         | 0200 0000                               | 0           | 0 | 0 | 0 |
|                               | 0220 0000                               |             |   |   |   |
| 36 Mb                         | 0240 0000                               | 0           | 0 | 0 | 0 |
|                               | 0260 0000                               |             |   |   |   |
| 40 Mb                         | 0280 0000                               | 0           | 0 | 0 | 0 |
|                               | 02A0 0000                               |             |   |   |   |
| 44 Mb                         | 02C0 0000                               | 0           | 0 | 0 | 0 |
|                               | 02E0 0000                               |             |   |   |   |
| 48 Mb                         | 0300 0000                               | 0           | 0 | 0 | 0 |
|                               | 0320 0000                               |             |   |   |   |
| 52 Mb                         | 0340 0000                               | 0           | 0 | 0 | 0 |
|                               | 0360 0000                               |             |   |   |   |
| 56 Mb                         | 0380 0000                               | 0           | 0 | 0 | 0 |
|                               | 03A0 0000                               |             |   |   |   |
| 60 Mb                         | 03C0 0000                               | 0           | 0 | 0 | 0 |
|                               | 03E0 0000                               |             |   |   |   |
| (dec)                         | (hex)                                   | 8           | 7 | 6 | 5 |
| Start<br>address              | VME/VS<br>start<br>address              | S2          |   |   |   |
|                               |                                         | VSB         |   |   |   |

Notes: A "1" means switch is **off**  
A "0" means switch is **on**  
The CSR address of the MV  
position of the switch S1 is al

### 10.1.3 Limitations on Amount of System Memory

The MVME320A/B is a 24 bits VMEbus user, this results in a maximum addressing capability of 16Mbyte. So, when the MVME320A/B is installed in a P90X0 the maximal memory size is 16Mb.

### 10.1.4 Configuring the System Memory

After changing the system's memory configuration, it may be necessary to reconfigure the memory declarations in the Kernel (see section 1.3.2.25).

To determine whether the Kernel has to be rebuilt or not, the following remarks, depending on the system's memory configuration, are important.

The kernel declarations that must be checked or changed can be found under the **sysgen** screen 'Miscellaneous System Declarations'.

These declarations being discussed here are grouped together and look like:

| Memory Select | Memory Range        |             | Block Size |
|---------------|---------------------|-------------|------------|
|               | hex                 | decimal     |            |
| mem330        | 00C00000 - 01000000 | 12Mb - 16Mb | 0          |
| mem_0         | 00000000 - 00C00000 | 0 - 12Mb    | 400.000    |
| mem_1         | 00C00000 - 01000000 | 12Mb - 16Mb | 200.000    |
| mem_2         | 01000000 - 04000000 | 16Mb - 64Mb | 200.000    |
| memdebug      | FFC00000 - FFFFFFFF |             | 0          |

In principle there are 3 different situations in according to the memory configurations, namely:

- 1 The system is equipped with one or more MVME330 boards.  
In this case the declaration **mem330** must be enabled and **mem\_1** must be disabled. The address range 00C00000 till 01000000 (12 till 16Mbyte) is reserved for the MVME330 boards and may not be used by another memory module.
- 2 There are no MVME330 boards in the system.  
In this case the declaration **mem330** must be disabled and **mem\_1** must be enabled. The address range 00C00000 till 01000000 is not needed by the MVME330 and can be used by the memory modules.
- 3 The system is equipped with one or two MVME320A/B boards.  
The MVME320A/B is a 24bits VMEbus user, so the highest possible address is 00FFFFFF (16Mbyte). The memory capacity may not be more then 16Mbyte. If more then 16Mbyte, the MVME320A/B will not be able to locate its control block (the Event Control Area) because this can be in the memory range above 16Mbyte.



If a declaration is changed, the kernel must be rebuild and the system must be rebooted.

Since this is considered to be the System Administrator's task, this procedure is not covered in the CE-Manual.

- NOTES:** 1. *memdebug is private memory covering the address range above the 16Mbyte and always enabled.*
2. *See chapter 6 of System V/68 Release 3, System Administrator's Guide, Supporting Information for parameter values.*

### 10.1.5 MVME134/MVME147 Offboard Memory

If a MVME134 or a MVME147 and one or more additional memory boards are in use, the rules to expand the amount of system memory must be applied.

The start address of the memory range on the offboard memory modules must follow the memory range of the processor module. For strapping of the additional memory modules see the sections about these memory modules.

Also the KERNEL parameter 'WAITRMC' must be set to 1, so run **sysgen** and:

- select the system which has to be adapted
- select and open the 'Kernel and Paging Parameter's
- select 'WAITRMC' and set to 1 if necessary
- quit **sysgen**
- rebuild the Kernel (if 'WAITRMC' was changed) and reboot the system.

#### Strapsetting

The start address of the offboard memory in case of the MVME134 and the MVME147 (4 Mbyte onboard memory) is 4Mbyte, for the strapsetting of the MVME224-2 and the MVME224A-x, see table in section 10.1.4.

The start address of the offboard memory in case of the MVME147(S)A (8Mbyte onboard memory) is 8Mbyte, in case of the MVME147SB the start address is 16Mbyte. For the strapsetting see the sections dealing with the memory modules.

In case of the MVME147 processor module the start address of the offboard memory must be set in the Non Volatile RAM (NVRAM) on address FFFE0764-FFFE0767. This NVRAM address contains standard the start address for a 8Mbyte onboard memory.. The NVRAM address FFFE0768-FFFE076B should contains the end address of the offboard memory.

Check this via the MVME147 bug, see the Field Support Manual MVME147 Bug Debugging Package P90X0.

**Remark:** *With the release of the MVME147SB the offboard memory is not supported anymore, this because of the large onboard memory capacity of the new MVME147 processor modules.*





## **10.2 MVME204-2F**

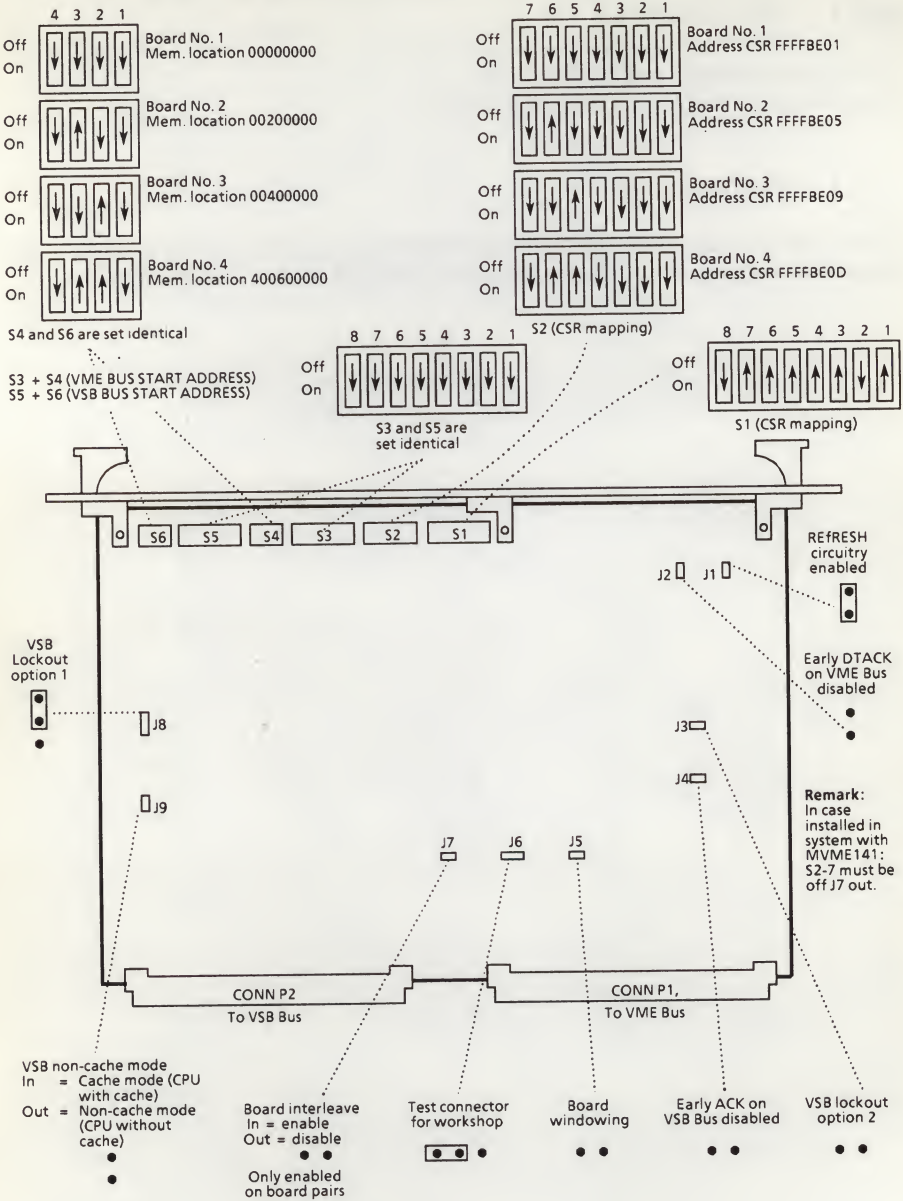
### **10.2.1 Characteristics**

For the characteristics see section 10.1.  
The MVME204-F2 is End Commercial Delivery.

### **10.2.2 Connections**

When using the VME Subsystem Bus (VSB) the VSB flatcable has to be present on the P2 backplane connectors on the cardslots used by the memory boards and the processor.

## 10.2.3 Strap Settings (for combinations with MVME224(A), see section 10.1.2)



# Switches on the MVME204-2F board.

| Control Status Register address is selected with the switches S1 and S2 |             |        |    |   |   |   |   |   |   |   |    |   |   |   |   |   |   |
|-------------------------------------------------------------------------|-------------|--------|----|---|---|---|---|---|---|---|----|---|---|---|---|---|---|
| Board No.                                                               | Setting     |        | S1 |   |   |   |   |   |   |   | S2 |   |   |   |   |   |   |
|                                                                         | Address CSR | On Off | 1  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1  | 2 | 3 | 4 | 5 | 6 | 7 |
| 1                                                                       | FFFFBE01    | On     |    | X |   |   |   |   |   | X | X  | X | X | X | X | X | X |
|                                                                         |             | Off    | X  |   | X | X | X | X | X |   |    |   |   |   |   |   |   |
| 2                                                                       | FFFFBE05    | On     |    | X |   |   |   |   |   | X | X  | X | X | X | X |   | X |
|                                                                         |             | Off    | X  |   | X | X | X | X | X |   |    |   |   |   |   | X |   |
| 3                                                                       | FFFFBE09    | On     |    | X |   |   |   |   |   | X | X  | X | X | X |   | X | X |
|                                                                         |             | Off    | X  |   | X | X | X | X | X |   |    |   |   |   | X |   |   |
| 4                                                                       | FFFFBE0D    | On     |    | X |   |   |   |   |   | X | X  | X | X | X |   |   | X |
|                                                                         |             | Off    | X  |   | X | X | X | X | X |   |    |   |   |   | X | X |   |

| VME Bus address selected with the switches S3 and S4, the VSB Bus address is the same and uses the switches S5 and S6. |                 |           |           |       |       |       |       |       |       |       |           |       |       |       |  |
|------------------------------------------------------------------------------------------------------------------------|-----------------|-----------|-----------|-------|-------|-------|-------|-------|-------|-------|-----------|-------|-------|-------|--|
| Board No.                                                                                                              | Setting         |           | S3 and S5 |       |       |       |       |       |       |       | S4 and S6 |       |       |       |  |
|                                                                                                                        | Address VME/VSB | On Off    | 1         | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 1         | 2     | 3     | 4     |  |
| 1                                                                                                                      | 00000000        | On<br>Off | X<br>     | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br>     | X<br> | X<br> | X<br> |  |
| 2                                                                                                                      | 00200000        | On<br>Off | X<br>     | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br>     | X<br> | <br>X | X<br> |  |
| 3                                                                                                                      | 00400000        | On<br>Off | X<br>     | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br>     | <br>X | X<br> | X<br> |  |
| 4                                                                                                                      | 00600000        | on<br>Off | X<br>     | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br> | X<br>     | <br>X | <br>X | X<br> |  |

- \* If a number of MVME204-2F boards are installed in a system with a MVME330A/B the address range 12 Mb through 16 Mb is reserved for MVME330A/B and cannot be used to strap memory boards for this address range.



## **10.2.4 Installation MVME204-2F**

For the installation and positioning rules in a cabinet, see chapter 2.

## **10.2.5 Maintenance MVME204-2F**

For the tests and the diagnostics for the MVME204-2F, see chapter 3.

The Memory board has a built-in self test, this test is started at power-up.

The Memory can also be tested using the processor debugger and diagnostics. The board can also be tested via the SSID tests.

## **10.3 MVME205**

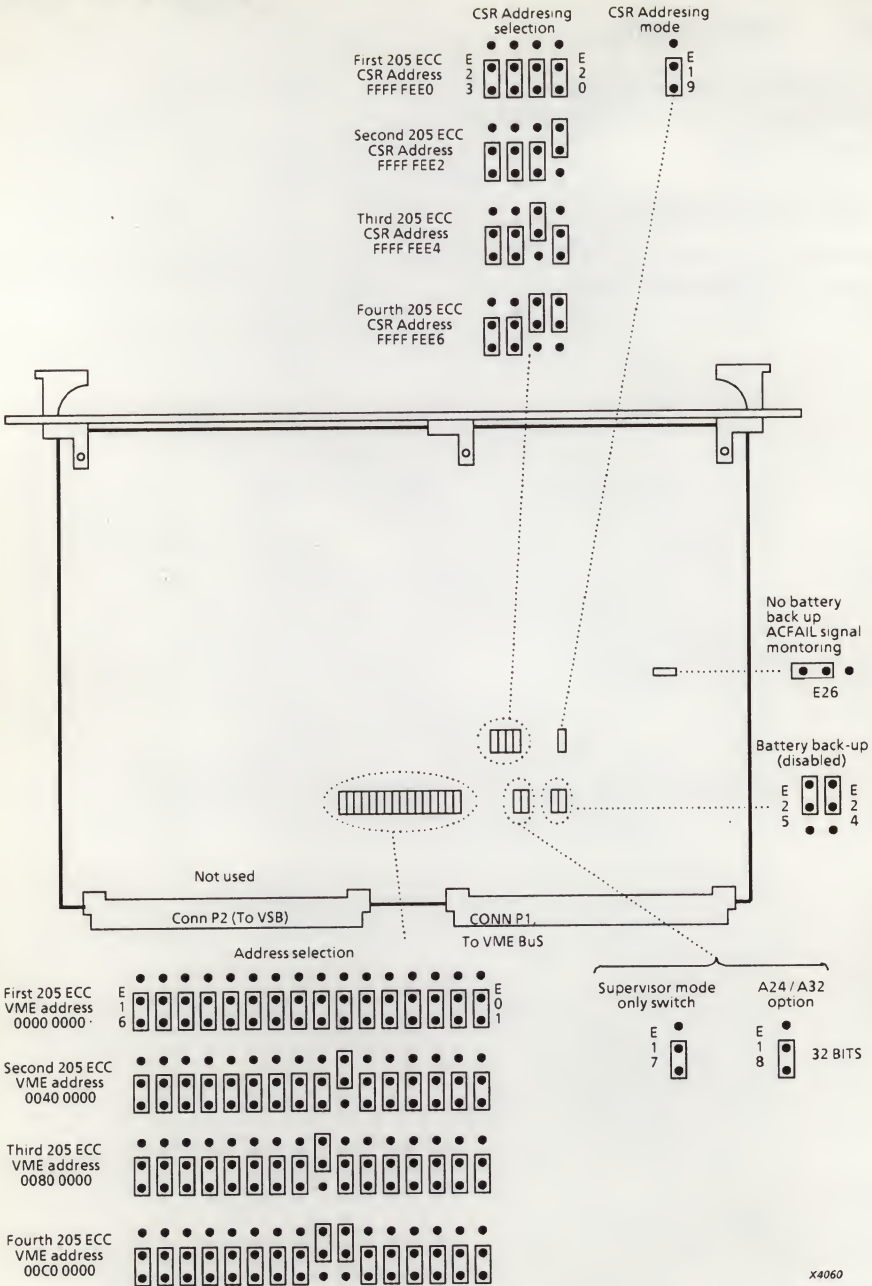
### **10.3.1 Characteristics**

For the characteristics see section 10.1.  
The MVME205 is End Commercial Delivery.

### **10.3.2 Connections**

The MVME205 memory cannot use the VME Subsystem Bus, so take care that the VSB cable on the backplane is removed.

# 10.3.3 Strap Settings



## LEDs on the board MVME205

| NAME | LED COLOUR | FUNCTION                                                                                | REMARKS                                                                                                                                           |
|------|------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| DBIT | Red        | Double bit or multiple bit error has occurred.                                          | An interrupt is send to the CPU to indicate this error.The LED stays ON until the CSR is read, or a system reset is given.                        |
| SBIT | Yellow     | Single bit error has occurred.                                                          | An interrupt is only send to the CPU if the Error Corection logic is disabled.The LED stays ON until the CSR is read, or a system reset is given. |
| INIT | Green      | Signals that the initialization of the memory is complete and that operation is normal. | Normally this LED is allways ON.                                                                                                                  |

**NOTE:** *If a number of MVME205 boards are installed in a system with a MVME330A/B the address range 12Mb through 16Mb is reserved for the MVME330A/B and can not be used to strap memory boards for this address range.*



### 10.3.4 Installation

For the installation and positioning rules in a cabinet, see chapter 2.

**Note:** *When multiple MVME205 memory boards are installed the revision levels of these boards should be the same.  
When a board is failing, all boards should be replaced by the current highest level:*

### 10.3.5 Maintenance

For the tests and the diagnostics for the MVME205, see chapter 3.

The Memory board has a built-in self test, this test is started at power-up.

The Memory can also be tested using the processor debugger and diagnostics. The board can also be tested via the SSID tests.

## **10.4 MVME224-2**

### **10.4.1 Characteristics**

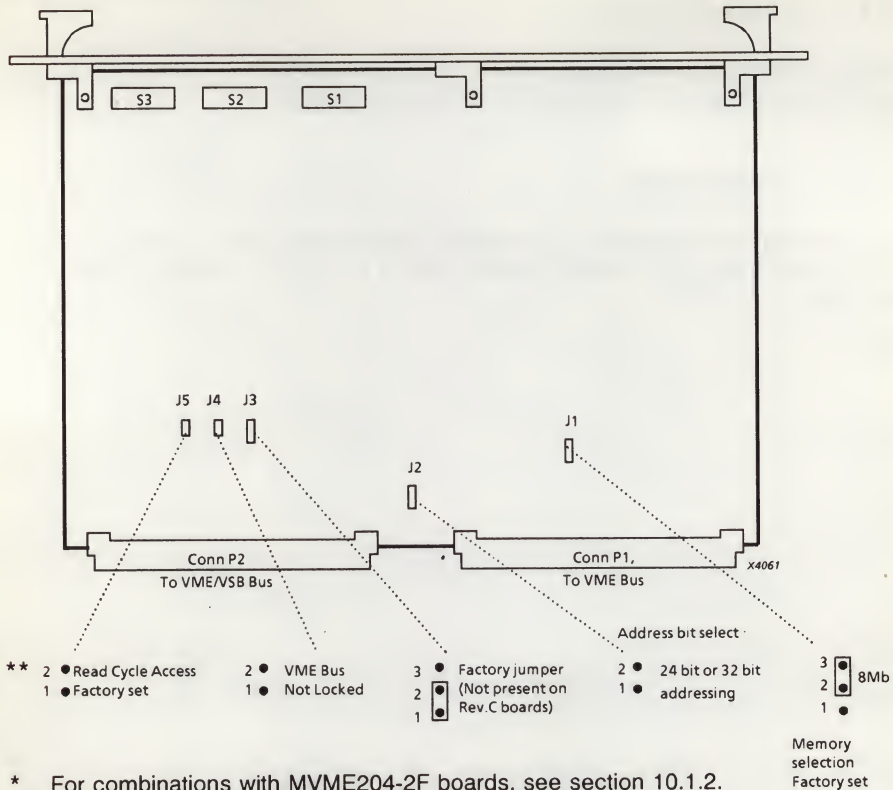
For the characteristics see section 10.1.

The MVME224 memory boards are End Commercial Delivery.

### **10.4.2 Connections**

When using the VME Subsystem Bus (VSB) the VSB flatcable has to be present on the P2 backplane connectors on the cardslots used by the memory boards and the processor.

### 10.4.3 Strap Settings \*



- \* For combinations with MVME204-2F boards, see section 10.1.2.
- \*\* If MVME224-2 and MVME141 / MVME147, J5 must be removed.  
If MVME224-2 and MVME131 / MVME132, J5 must be installed.

**NOTE:** When using the MVME224 in combination with the MVME131XT or MVME132XT processor the switch S4-3 on the processor must be in the **off** position.

## Switches on the MVME224-2 board

**REMARKS:** VMEbus Address Mapping S1-1 to S1-8 and S2-1 to S2-4.

VSBus Address Mapping S2-5 to S2-8 and S3-1 to S3-8.

CRS Mapping - Base address is FFFFBE01, increasing 4 bytes for each 2-megabyte increase of VMEbus Address Mapping.

|               |     | S3 |   |   |   |   |   |   | S2 |   |   |   |   |   |   | S1 |   |   |   |   |   |   | Start<br>addr. | CSR<br>addr. |   |          |           |
|---------------|-----|----|---|---|---|---|---|---|----|---|---|---|---|---|---|----|---|---|---|---|---|---|----------------|--------------|---|----------|-----------|
|               |     | 8  | 7 | 6 | 5 | 4 | 3 | 2 | 1  | 8 | 7 | 6 | 5 | 4 | 3 | 2  | 1 | 8 | 7 | 6 | 5 | 4 | 3              | 2            | 1 |          |           |
| Board<br>No 1 | Off | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓              | ↓            | ↓ | 00000000 | FFFF BE01 |
|               | On  | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓              | ↓            | ↓ |          |           |
| Board<br>No 2 | Off | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓              | ↓            | ↓ | 00800000 | FFFF BE11 |
|               | On  | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↑ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↑ | ↓              | ↓            | ↓ |          |           |
| Board<br>No 3 | Off | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓              | ↓            | ↓ | 01000000 | FFFF BE21 |
|               | On  | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↑ | ↓              | ↓            | ↓ |          |           |
| Board<br>No 4 | Off | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓              | ↓            | ↓ | 01800000 | FFFF BE31 |
|               | On  | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↑              | ↓            | ↓ |          |           |
| Board<br>No 5 | off | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓              | ↓            | ↓ | 02000000 | FFFF BE41 |
|               | On  | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓  | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓              | ↓            | ↓ |          |           |

- NOTES:**
1. If a number of MVME224-2 boards are installed in a system with a MVME330A/B the address range 12Mb through 16Mb is reserved for the MVME330A/B and can not be used to strap memory boards for this address range.
  2. When installing a MVME224-2 in combination with a MVME147 4Mb board, see section 10.1.5.



## LEDs on the MVME224-2

| LED | FUNCTION                                              | REMARKS |
|-----|-------------------------------------------------------|---------|
| VME | This LED indicates that access via the VMEbus occurs  |         |
| VSB | This LED indicates that access via the VSB bus occurs |         |

### 10.4.4 Installation

For the installation and positioning rules see chapter 2.

### 10.4.5 Maintenance

- The Memory board has a built-in self test, this test is started at power-up.

The Memory can also be tested using the processor debugger and diagnostics, and also via the SSID.

## 10.5 MVME224A-x

The MVME224A is available in four versions:

- |              |                       |              |
|--------------|-----------------------|--------------|
| - MVME224A-1 | 4Mbyte memory module  | Not released |
| - MVME224A-2 | 8Mbyte memory module  |              |
| - MVME224A-3 | 16Mbyte memory module |              |
| - MVME224A-4 | 32Mbyte memory module |              |

The differences between the four MVME224A boards are as follows:

- Addressing logic.
- Memory chips
  - MVME224A-1 half populated with 2Mb memory chips
  - MVME224A-3 half populated with 4Mb memory chips
  - MVME224A-2 fully populated with 2Mb memory chips
  - MVME224A-4 fully populated with 4Mb memory chips

It is not possible to upgrade a MVME224A to a MVME224A with a larger memory capacity.

### 10.5.2 Connections

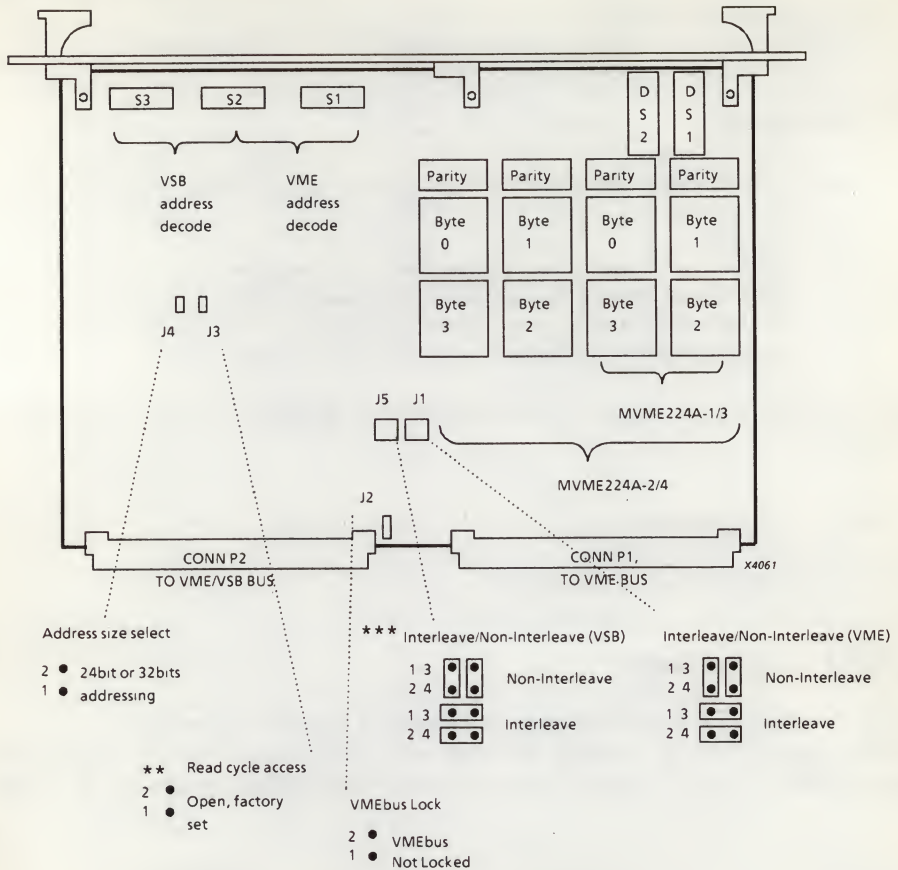
For the characteristics see section 10.1.

### 10.5.2 Connections

The MVME224 is a dual ported memory module, so the VSB can be used.

When the VSB has to be used, the VSB cable must be installed on the backplane connector P2 of all VSB users, so all memory modules and also the processor module.

## 10.5.3 Strap Settings \*



- \* If combined with MVME224-2 or MVME204-2F boards, see section 10.4.2 or 10.1.2
- \*\* If MVME224(A)-x and MVME141 / MVME147, J3 must be open.
- \*\* If MVME224(A)-x and MVME131 / MVME132, J3 must be closed.
- \*\*\* Interleave is only possible between board pairs of the same type and size.
- \*\*\* Interleave is done on the VME and VSB together.

## Switches on the MVME224A-x board

**REMARKS:** VMEbus Address decoding is done via the switches S1-1 through S1-8 and S2-1 through S2-4.

VSb Address decoding is done via the switches S2-5 through S2-8 and S3-1 through S3-8.

CSR Base address is FFFFBE01, increasing 4 bytes for each 2-megabyte increments of VMEbus Address space. The CSR address is decoded via the switches S1-2 through S1-7.

| VMEbus address decoding |   |   |   |                               |   |   |   |   |   |   |   | VME or VSB<br>beginning address<br>(hex) | VME CSR address<br>Short I/O<br>(1 byte) |
|-------------------------|---|---|---|-------------------------------|---|---|---|---|---|---|---|------------------------------------------|------------------------------------------|
| S2<br>-4 -3 -2 -1       |   |   |   | S1<br>-8 -7 -6 -5 -4 -3 -2 -1 |   |   |   |   |   |   |   |                                          |                                          |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0000 0000                                | FFFF BE01                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0010 0000                                | FFFF BE01                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0020 0000                                | FFFF BE05                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0030 0000                                | FFFF BE05                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0040 0000                                | FFFF BE09                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0050 0000                                | FFFF BE09                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0060 0000                                | FFFF BE0D                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0070 0000                                | FFFF BE0D                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0080 0000                                | FFFF BE11                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0100 0000                                | FFFF BE21                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0200 0000                                | FFFF BE41                                |
| 0                       | 0 | 0 | 0 | 0                             | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0400 0000                                | FFFF BE81                                |
| 0                       | 0 | 0 | 0 | 0                             | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0800 0000                                | FFFF BE01                                |
| 0                       | 0 | 0 | 1 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1000 0000                                | FFFF BE01                                |
| 0                       | 0 | 1 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2000 0000                                | FFFF BE01                                |
| 0                       | 1 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4000 0000                                | FFFF BE01                                |
| 1                       | 0 | 0 | 0 | 0                             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8000 0000                                | FFFF BE01                                |
| VSb address decoding    |   |   |   |                               |   |   |   |   |   |   |   | VME or VSB<br>beginning address<br>(hex) | VME CSR address<br>Short I/O<br>(1 byte) |
| S3<br>-8 -7 -6 -5       |   |   |   | S2<br>-4 -3 -2 -1             |   |   |   |   |   |   |   |                                          |                                          |

- NOTES:**
1. A switch in the **on** position is a 0, a switch in the **off** position is a 1.
  2. If a number of MVME224A-x boards are installed in a system with a MVME330A/B the address range 12Mb till 16Mb is reserved for the MVME330A/B. This memory range cannot be used by a memory module.
  2. When installing a MVME224A-x in combination with a MVME134 or a MVME147 the start address of the processor off-board memory must follow the end address of the processor onboard memory, see section 10.1.5.



## LEDs on the MVME224A-x

| LED | FUNCTION                                             | REMARKS              |
|-----|------------------------------------------------------|----------------------|
| DS1 | This LED indicates that access via the VMEbus occurs | Front panel name VME |
| DS2 | This LED indicates that access via the VSB occurs    | Front panel name VSB |

### 10.5.4 Installation

For the installation and positionings rules see chapter 2.

### 10.5.5 Maintenance

For the tests and diagnostics see chapter 3.

The Memory board has a built-in self test, this test is started at power-up.

The Memory can also be tested using the processor debugger and the SSID.

## 10.6 MVME236-x

The MVME236 memory module, used with the MVME181, is not released.

The MVME236-x is available in three versions:

- MVME236-1      4Mbyte memory module
- MVME236-2      8Mbyte memory module
- MVME236-3      16Mbyte memory module

The differences between the three MVME236-x boards are as follows:

- Addressing logic.
- Number of memory chips
  - MVME236-1      25% populated with 1Mb DRAM chips
  - MVME236-2      half populated with 1Mb DRAM chips
  - MVME236-3      fully populated with 1Mb DRAM chips

It is not possible to upgrade a MVME236-2 to a MVME236-3 (larger memory capacity).

The maximum number of MVME236-x boards allowed (not together) in one system are:

- P9050-R    3 times a MVME236-2  
                 2 times a MVME236-3
- P9070-R    4 times a MVME236-2  
                 3 times a MVME236-3

### 10.6.1 Connections

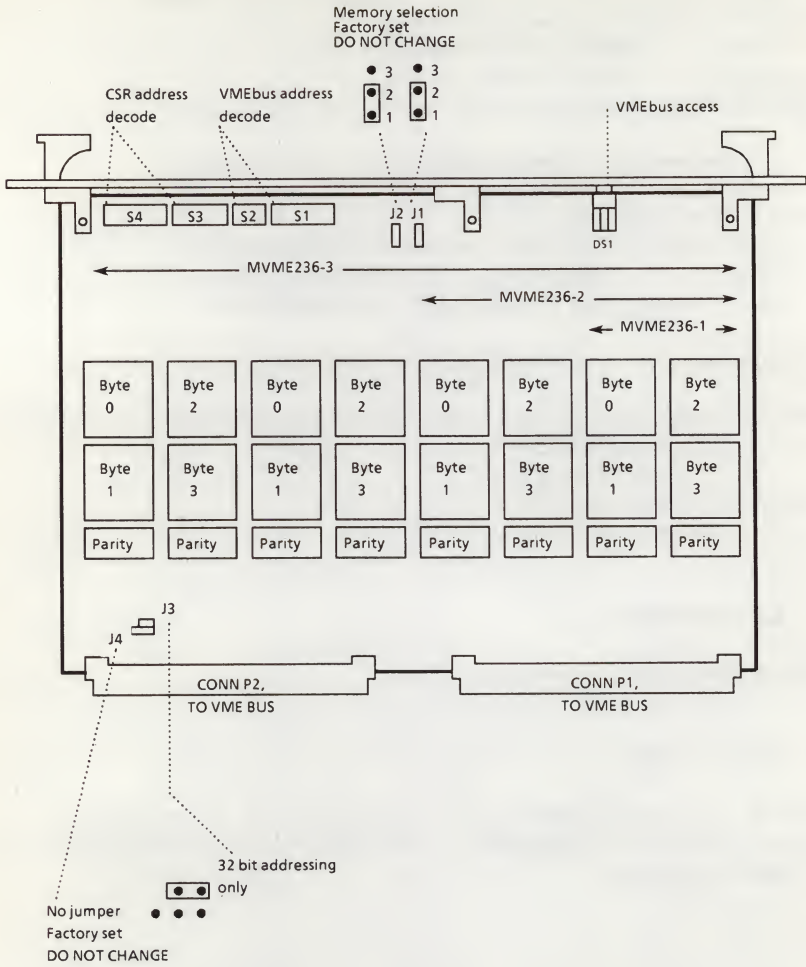
For the characteristics see section 10.1.

### 10.6.2 Connections

The MVME236-x is a single ported memory module, so it does not use the VSB.

The only connection to/from the MVME236-x is to/from the VMEbus (backplane), made via the P1 and P2 connector.

10.6.3 Strap Settings



## Switches on the MVME236-x board

**REMARKS:** VMEbus Address decoding is done via the switches S1-1 (LSB) through S1-8 and S2-1 through S2-4 (MSB).

The CSR address is decoded via the switches S3-1 (LSB) through S4-8 (MSB).

Remember, the MVME181 RISC processor module has 8Mbyte of memory on board, so standard the start address of the MVME236 memory range starts on hex. 0080 0000 (8Mb).

| VMEbus address mapping switches |    |    |    |    |    |    |    |    |    |    |    | VME<br>beginning address<br>(hex) | VME<br>beginning address<br>(dec) |
|---------------------------------|----|----|----|----|----|----|----|----|----|----|----|-----------------------------------|-----------------------------------|
| S2                              |    |    |    | S1 |    |    |    |    |    |    |    |                                   |                                   |
| -4                              | -3 | -2 | -1 | -8 | -7 | -6 | -5 | -4 | -3 | -2 | -1 |                                   |                                   |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0000 0000                         | 0 Mb                              |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0080 0000                         | 8 Mb                              |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0100 0000                         | 16 Mb                             |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 0180 0000                         | 24 Mb                             |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0200 0000                         | 32 Mb                             |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 0280 0000                         | 40 Mb                             |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 0  | 0300 0000                         | 48 Mb                             |
| 0                               | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 0  | 0  | 0380 0000                         | 56 Mb                             |

| CSR address mapping switches  |   |   |   |   |   |   |                         |   |   |   |   |   |   | CSR address (hex) | VME beginning address (hex) |
|-------------------------------|---|---|---|---|---|---|-------------------------|---|---|---|---|---|---|-------------------|-----------------------------|
| S4<br>-8 -7 -6 -5 -4 -3 -2 -1 |   |   |   |   |   |   | S3<br>-6 -5 -4 -3 -2 -1 |   |   |   |   |   |   |                   |                             |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 0 | 0 | 0 | 1 | 0 | 0 | FFFF BE11         | 0000 0000                   |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 0 | 0 | 1 | 0 | 0 | 0 | FFFF BE21         | 0080 0000                   |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 0 | 0 | 1 | 1 | 0 | 0 | FFFF BE31         | 0100 0000                   |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 0 | 1 | 0 | 0 | 0 | 0 | FFFF BE41         | 0180 0000                   |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 0 | 1 | 0 | 1 | 0 | 0 | FFFF BE51         | 0200 0000                   |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 0 | 1 | 1 | 0 | 0 | 0 | FFFF BE61         | 0280 0000                   |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 0 | 1 | 1 | 1 | 0 | 0 | FFFF BE71         | 0300 0000                   |
| 1                             | 0 | 1 | 1 | 1 | 1 | 1 | 0                       | 1 | 0 | 0 | 0 | 0 | 0 | FFFF BE81         | 0380 0000                   |

**NOTE:** A switch in the **on** position is a **0**, a switch in the **off** position is a **1**.



## LEDs on the MVME236-x

| LED | FUNCTION                                             | REMARKS              |
|-----|------------------------------------------------------|----------------------|
| DS1 | This LED indicates that access via the VMEbus occurs | Front panel name VME |

### 10.6.4 Installation

For the installation and position rules see chapter 2.

### 10.6.5 Maintenance

For the tests and the diagnostics see chapter 3.

The Memory board has a built-in self test, this test is started at power-up.

The Memory can also be tested using the processor debugger and the SSID.

## 10.7 MVME288

The MVME288 is the MVME188(A) local memory module, it is an integral part of the MVME188(A) RISC processor module, see also chapter 9.

The first MVME188(A) memory board in the MVME188(A) RISC processor module will be marked with "188" on the top Scanbe handle. Memory boards added after the MVME188(A) RISC processor module is factory built will be marked with "288" on the top Scanbe handle. These 188 and 288 memory boards are identical if they have the same part number.

The middle board(s) of the MVME188(A) RISC processor module is the MVME288 memory module. The number of MVME288 boards can be 1 (one) up to a maximum of 4 (four).

The MVME288 is deliverable in 2 memory capacities, namely

- MVME288-16      16Mbyte memory module
- MVME288-64      64Mbyte memory module.

There are two versions of memory modules, namely:

- Old version, the MVME188D      This old version does have two set of DIP switches. This board may not be used in the MVME188A RISC Procссор module.
- New version, the MVME288      This one does have only one set of DIP switches, namely Memory Board Switch S1.

In this chapter whenever the MVME288 is referred to, the MVME288-16 or MVME288-64 can be referred also.

### 10.7.1 Characteristics

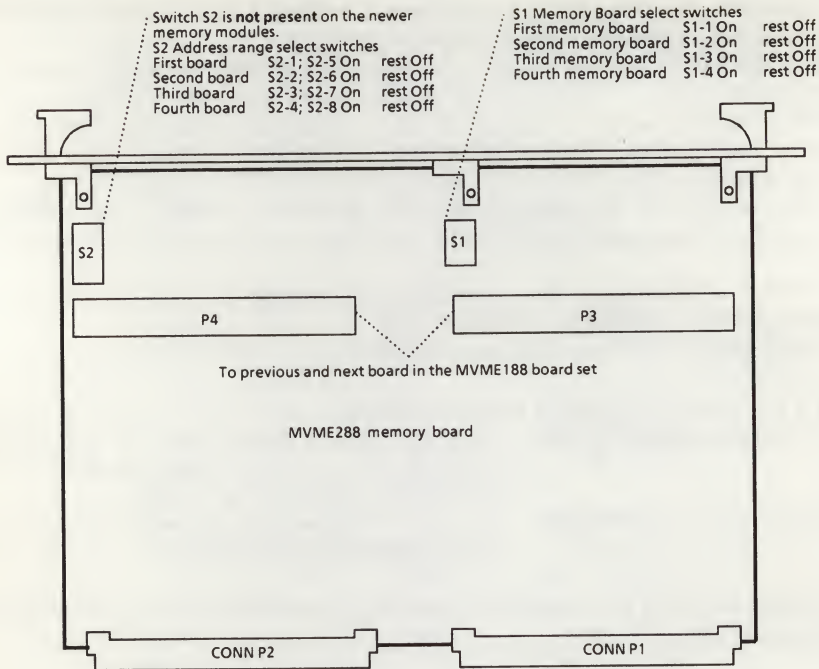
For the characteristics see section 10.1.

### 10.7.2 Connections

The backplane connectors P1 and P2 on the MVME288 memory board are only used to connect the Vcc (+5V dc) and the ground (GND) to the board. The MVME288 is not connected to the VMEbus.

The P3 and P4 connectors connects to similar connectors on the previous and next boards in the MVME188(A) board set, these connectors carries the internal signals required on the boards in the MVME188(A) board set.

## 10.7.3 Strap Settings



**REMARKS:** A switch in the **on** position is closed.

Switch S1 is used to select the board number, one board must be set up as the first board (board 0) for refresh to work properly.

Switch S2 (not present on the newer boards) is used for address range decoding. Address ranges are also set up by the operating software. The MVME188Bug debugging package, for example, sets up the following default address ranges for board 0 through 3:

16Mb Board 0 0000 0000 through 00FF FFFF  
 Board 1 0100 0000 through 01FF FFFF  
 Board 2 0200 0000 through 02FF FFFF  
 Board 4 0300 0000 through 03FF FFFF  
 64Mb Board 0 0000 0000 through 03FF FFFF  
 Board 1 0400 0000 through 07FF FFFF  
 Board 2 0800 0000 through 0DFF FFFF  
 Board 4 0C00 0000 through 0FFF FFFF

The older memory boards with two sets of DIP switches may **not** be used on the MVME188A RISC Processor module

#### **10.7.4 Installation**

The MVME288 is a part of the MVME188(A) RISC processor module, so for the removal of this module see section 9.10.

#### **10.7.5 Maintenance**

For testing, diagnosing and corrective maintenance, see chapter 9.10.

##### **Positioning of MVME288**

See chapter 4 for the MVME288 positioning.





Section:

Page:

|                   |        |
|-------------------|--------|
| 1: Technical Data | 12.1-1 |
|-------------------|--------|

|                        |        |        |        |        |        |
|------------------------|--------|--------|--------|--------|--------|
| 2: MVME 320A           | 12.2-1 | 12.2-1 | 12.2-2 | 12.2-4 | 12.2-4 |
| 3: MVME 320B           | 12.3-1 | 12.3-1 | 12.3-2 | 12.3-4 | 12.3-4 |
| 4: MVME 323-1/2 (ESDI) | 12.4-1 | 12.4-1 | 12.4-2 | 12.4-4 | 12.4-4 |
| 5: MVME 327A (SCSI)    | 12.5-1 | 12.5-2 | 12.5-3 | 12.5-4 | 12.5-4 |
| 6: MVME 328-1/2 (SCSI) | 12.6-1 | 12.6-2 | 12.6-4 | 12.6-5 | 12.6-5 |

Subsection:

|   |                 |        |
|---|-----------------|--------|
| 1 | Characteristics | _____↑ |
| 2 | Connections     | _____↑ |
| 3 | Strap Settings  | _____↑ |
| 4 | Installation    | _____↑ |
| 5 | Maintenance     | _____↑ |

**NOTE:** *n.a. means that this section is not available for this unit.*



## 12.1 TECHNICAL DATA

|                                  | MVME327A                                                                           | MVME328-1                                                                            | MVME328-2                                                                         |
|----------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Floppy Disk Devices              | Two 1.1.6 Mb<br>SA400 450 FFD's                                                    | No other then SCSI                                                                   | no other then SCSI                                                                |
| SCSI Devices<br>(typical)        | MAX 7:<br>- 4 Hard Disk Units<br>- 2 Tape Units<br>- 1 Floppy Disk Unit            | MAX 7:<br>- 4 Hard Disk Units<br>- 2 Tape Units<br>- 1 Floppy Disk Unit              | MAX 14:<br>- 8 Hard Disk Units<br>- 4 Tape Units<br>- 2 Floppy Disk Units         |
| Max. Number of CU per<br>Cabinet | P9030: no<br>P9050: Typ. 1, max. 2<br>P9070: Typ. 1, max.2<br>P9090: Typ. 1, max.2 | P9030: no<br>P9050: Typ. 1, max. 2<br>P9070: Typ. 1, max. 2<br>P9090: Typ. 1, max. 2 | P9030: no<br>P9050: Typ.1, max. 2<br>P9070: Typ.1, max. 2<br>P9090: Typ.1, max. 2 |
| SCSI Transfer Rate.              | Async: 1.5 Mb/s<br>Sync : 4 Mb/s                                                   | Async: 1.5 Mb/s<br>Sync : 4 Mb/s                                                     | Async: 1.5 Mb/s<br>Sync : 4 Mb/s                                                  |
| Power Requirements               | +5Vdc, 4.3A (typ)<br>4.6A (max)                                                    | +5Vdc, 4.67A (typ)<br>6.85A (max)                                                    | +5Vdc, 5.43A (typ)<br>8.1A (max)                                                  |
| Test Programs                    | Processor BUG<br>SSID                                                              | Processor BUG (RISC)<br>SSID                                                         | ProcessorBUG (RISC)<br>SSID                                                       |

|                                  | MVME320A                                                                | MVME320B                                                                | MVME323                                                      |
|----------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------|
| Floppy Disk Devices              | 5.25" TEAC, max. 2<br>(capacity 653 Kb)                                 | 5.25" TEAC, max. 2<br>(capacity 1.2 Mb/653Kb)                           | --                                                           |
| Hard Disk Devices                | 5.25" MICROPOLIS<br>max. 2                                              | 5.25" MICROPOLIS<br>max. 2                                              | 5.25" WREN III<br>5.25" WREN V<br>P9070: max. 4              |
| Max. Number of CU per<br>Cabinet | P9030: no<br>P9050: Typ. 1, max. 1<br>P9070: Typ. 1, max.2<br>P9090: no | P9030: no<br>P9050: Typ. 1, max. 1<br>P9070: Typ. 1, max.2<br>P9090: no | P9030: no<br>P9050: max. 1<br>P9070: max. 1<br>P9090: max .1 |
| Serial Data Speed Max.           | FDD: 250 Kbits/sec<br>FXD: 5 Mbits/sec                                  | FDD: 250 Kbits/sec<br>FXD: 5 Mbits/sec                                  | FXD: 10 Mbits/sec                                            |
| Power Requirements               | +5V, 2.6A (max. 3A)<br>+12V / -12V<br>20 mA (max. 30 mA)                | +5V, 3.9 typical<br>+12V, 60 mA typical<br>-12V, 20 mA, typical         | +5V, 4.5A max.                                               |
| Test Programs                    | Processor BUG<br>SSID                                                   | Processor BUG<br>SSID                                                   | Processor BUG<br>SSID                                        |





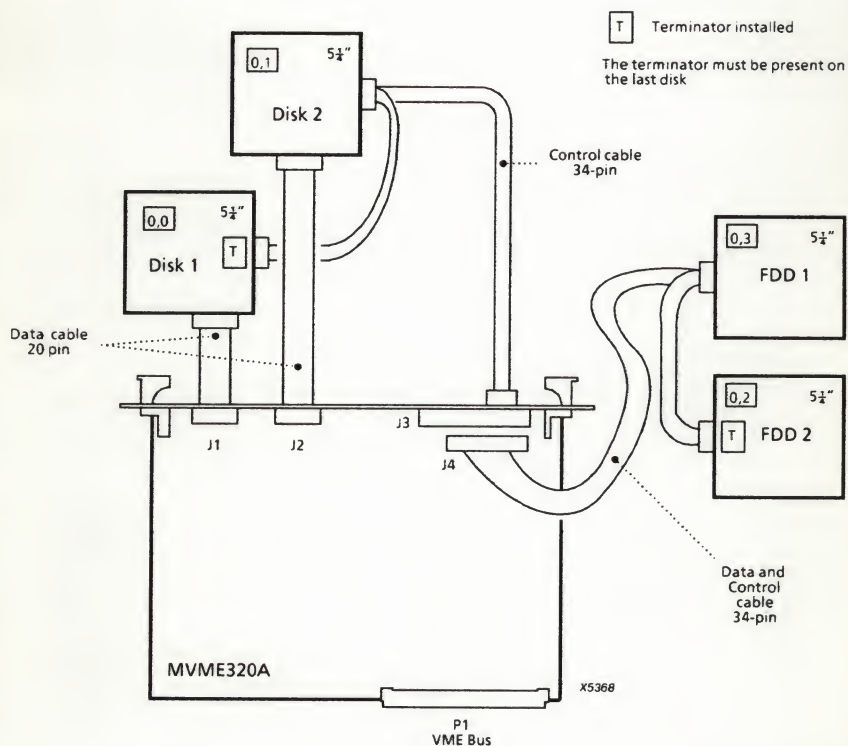
## 12.2 MVME320A

The MVME320A is End Commercial Delivery

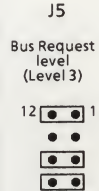
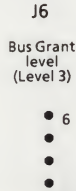
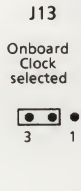
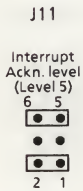
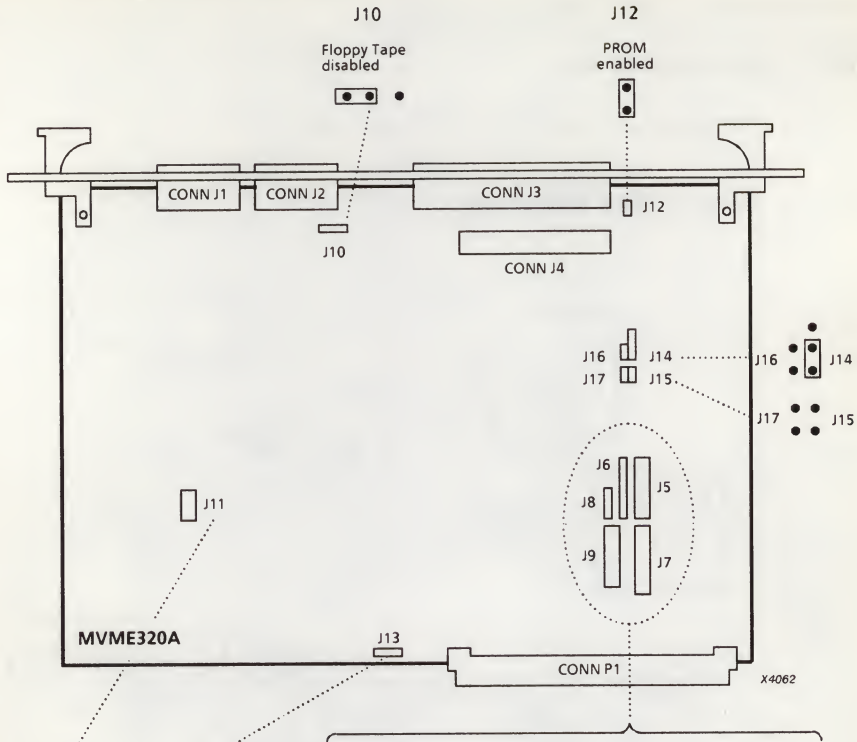
### 12.2.1 Characteristics

For the characteristics and the technical data see section 12.1.

### 12.2.2 Connections MVME320A



## 12.2.3 Strap Settings MVME320A



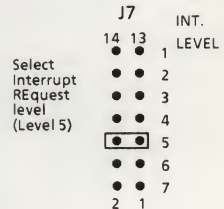
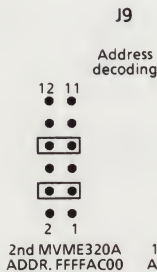
### CAUTION

When using this controller:

- 1) CPU's 131DOF, 131XT, 132DOF, 132XT, 134 } Must be set to 24 bits mode

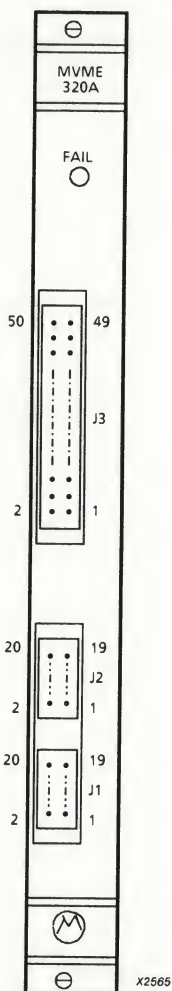
- 2) Max. memory size is 16Mb

- 3) Processor and memory boards must be set to 24 bits



## LED's on the MVME320A

| LED  | FUNCTION                                                                                                                    | ACTION |
|------|-----------------------------------------------------------------------------------------------------------------------------|--------|
| FAIL | The LED is on during the automatic board test and in case of a 'FAIL' situation.<br>During normal operation the LED is OFF. | --     |





## **12.2.4 Installation MVME320A (P9050/P9070)**

For the installation and positioning rules see chapter 2.

## **12.2.5 Maintenance MVME320A**

For the tests and the diagnostics see chapter 3.

The MVME320A has a built-in self test, this test is started at power-up.

The MVME320A can also be tested using the processor debugger and diagnostics, and via the SSID tests.

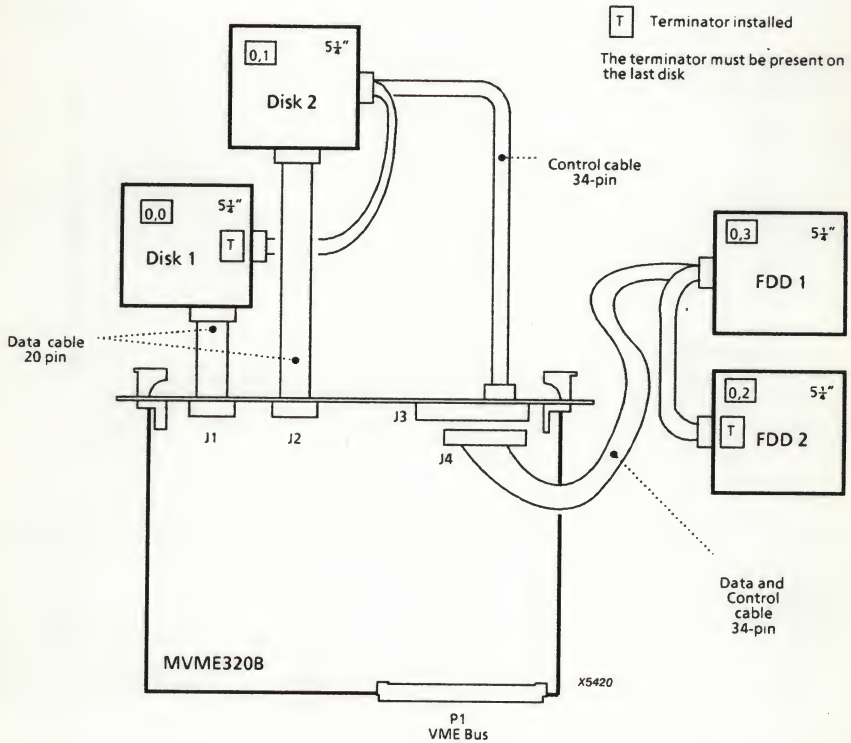
## 12.3 MVME320B

The MVME320B is End Commercial Delivery

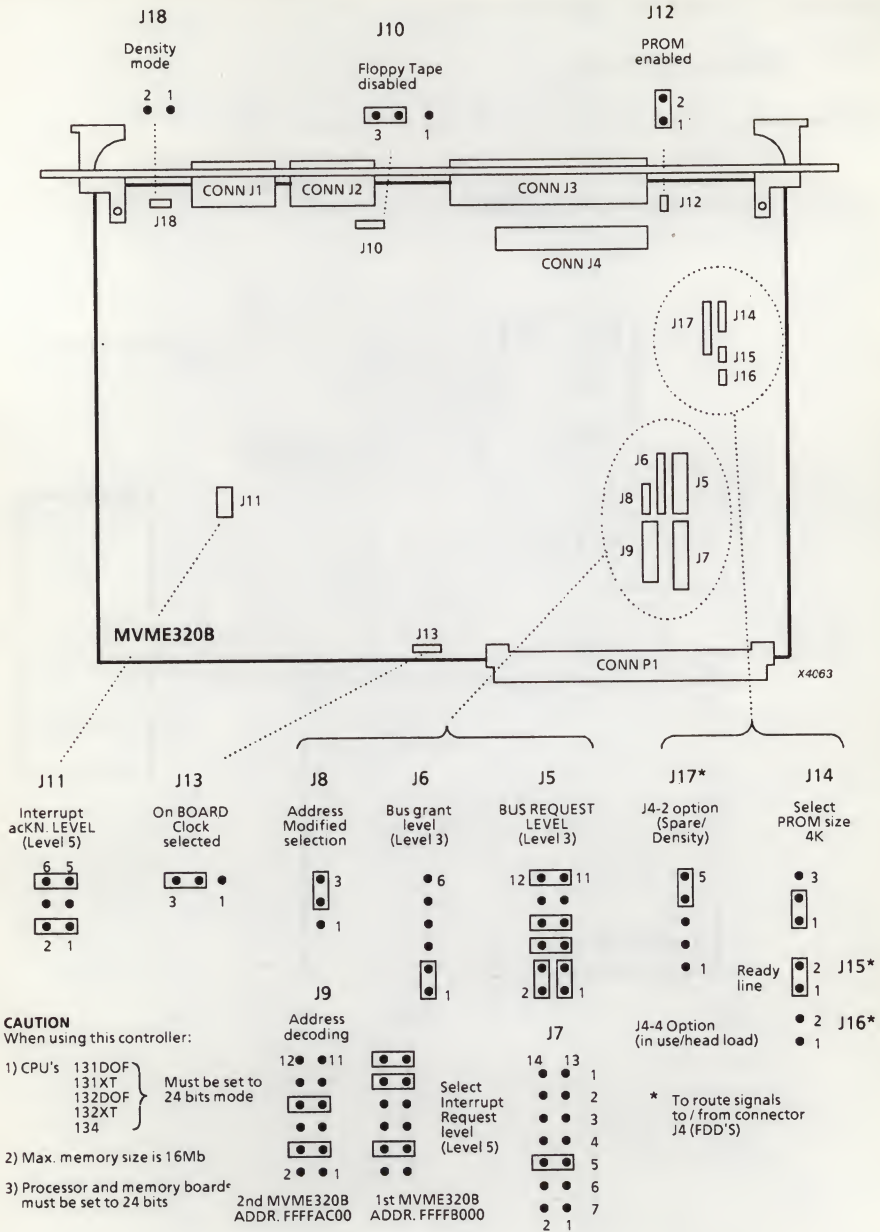
### 12.3.1 Characteristics

For the characteristics and the technical data see section 12.1.

### 12.3.2 Connections MVME320B

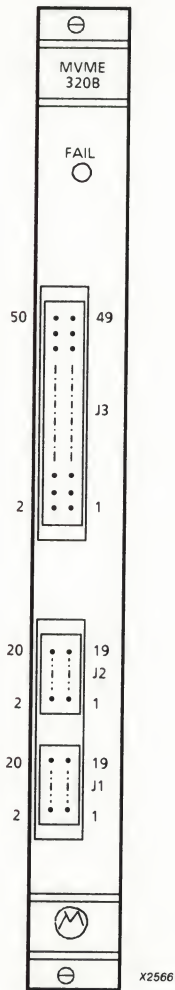


## 12.3.3 Strap Settings MVME320B



LED's on the MVME320B

| LED  | FUNCTION                                                                                                                    | ACTION |
|------|-----------------------------------------------------------------------------------------------------------------------------|--------|
| FAIL | The LED is ON during the automatic board test and in case of a "FAIL" situation.<br>During normal operation the LED is OFF. | - -    |





### **12.3.4 Installation MVME320B**

For the installation and positioning rules see chapter 2.

### **12.3.5 Maintenance MVME320B**

#### **Test and Diagnostics (see chapter 3)**

For the tests and the diagnostics see chapter 3.

The MVME320B has a built-in self test, this test is started at power-up.

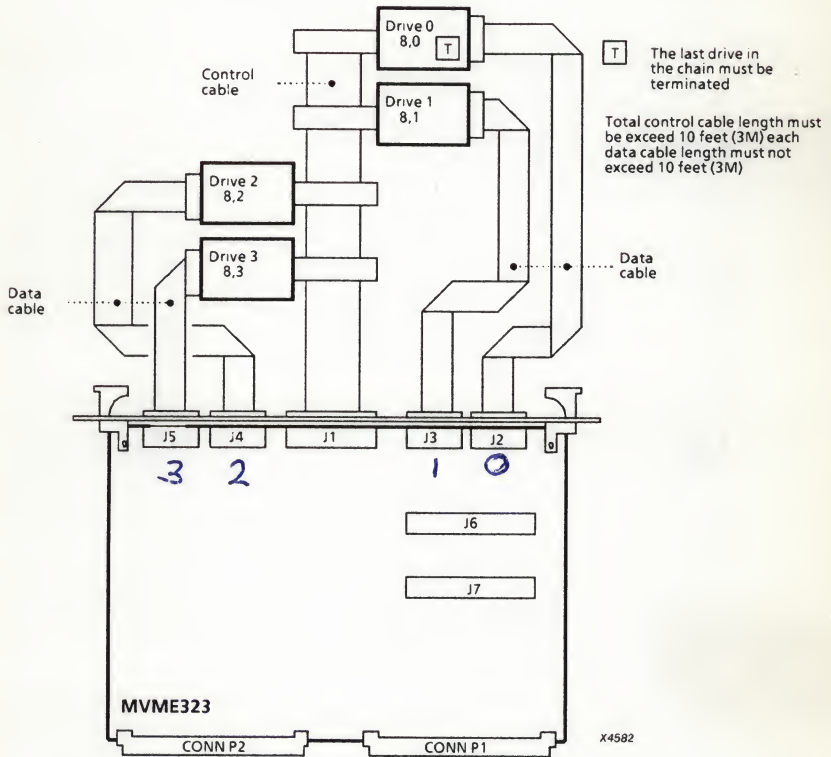
The MVME320B can also be tested using the processor debugger and diagnostics, and via the SSID tests.

## 12.4 MVME323-1/MVME323-2

### 12.4.1 Characteristics

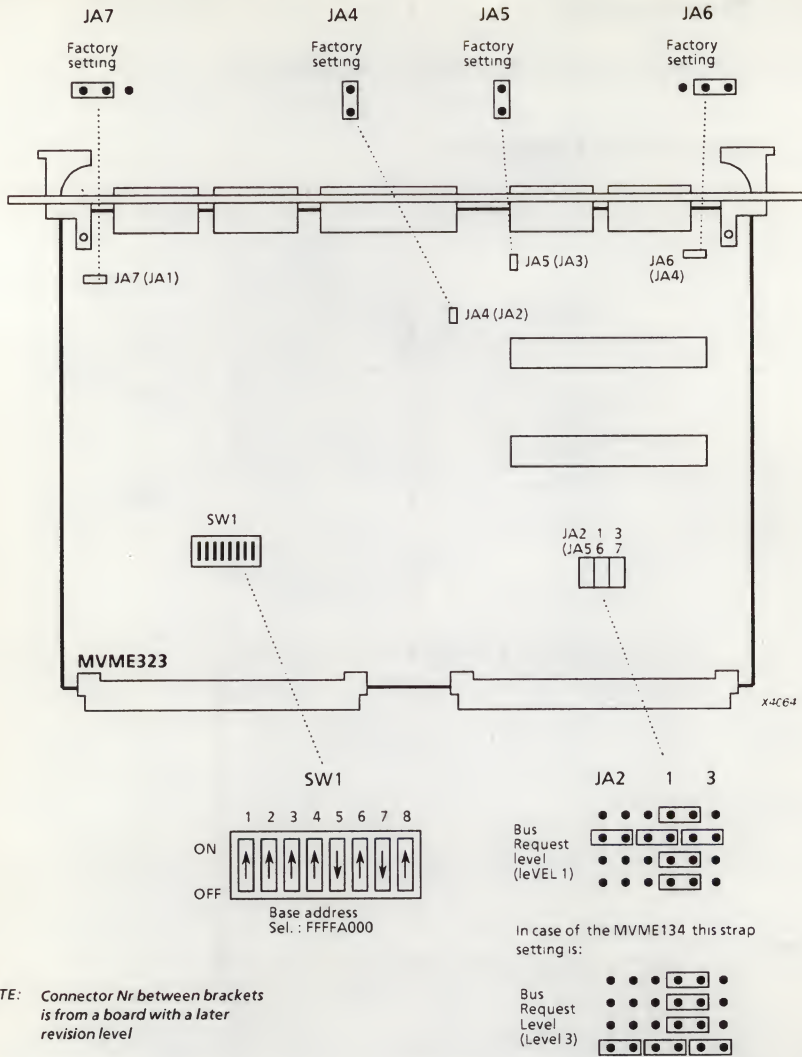
For the characteristics and the technical data see section 12.1.

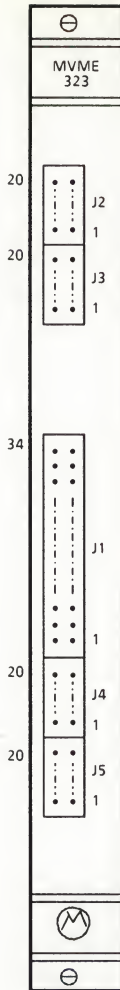
### 12.4.2 Connections MVME323\*



\* In this chapter when the MVME323 is referred to, the MVME323-1 and MVME323-2 can be referred also.

### 12.4.3 Strap Settings MVME323





X2567



#### **12.4.4 Installation MVME323**

For the installation and positioning rules see chapter 2.

#### **12.4.5 Maintenance MVME323**

##### **Test and Diagnostics (see chapter 3)**

For the tests and the diagnostics see chapter 3.

The MVME323 has a built-in self test, this test is started at power-up.

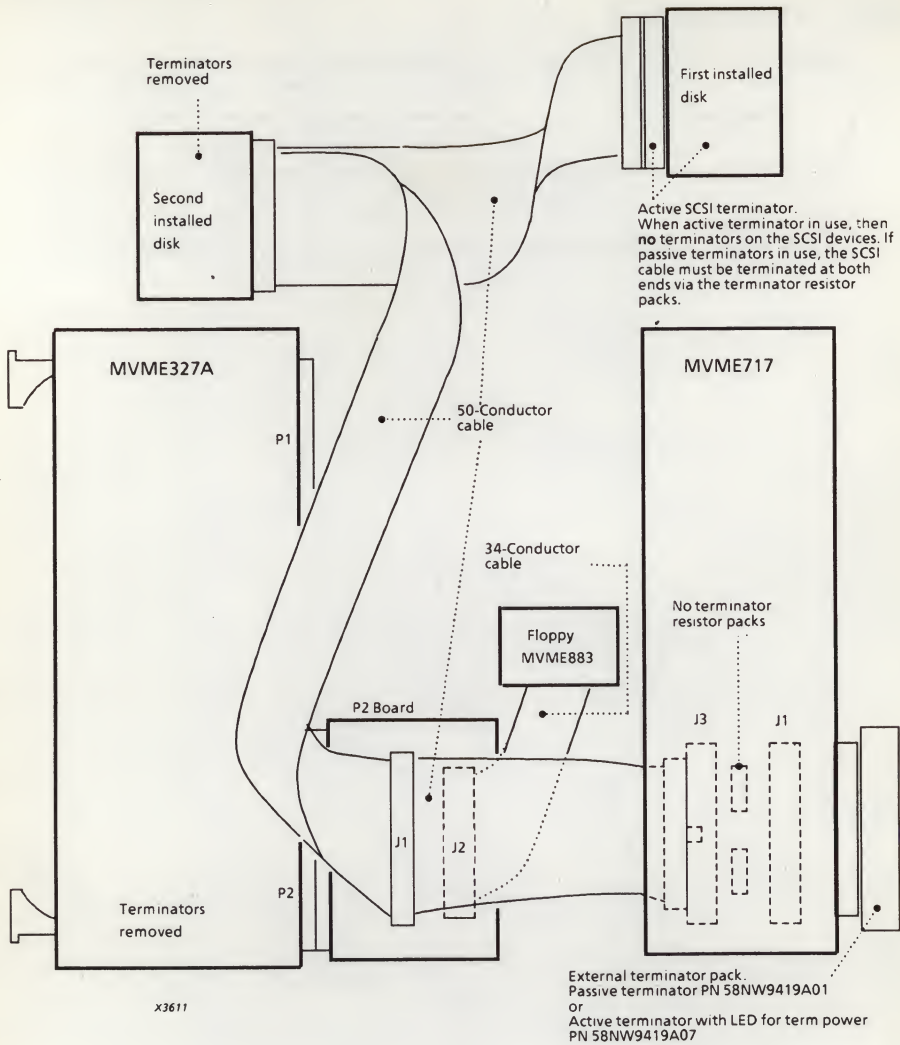
The MVME323 can also be tested using the processor debugger and diagnostics, and via the SSID

## 12.5 MVME327A SCSI ADAPTER / 717 TRANSITION BOARD

### 12.5.1 Characteristics

| Power Requirements | + 5 Volt |      | + 12 Volt |      | - 12 Volt |      |
|--------------------|----------|------|-----------|------|-----------|------|
|                    | typ.     | max. | typ.      | max. | typ.      | max. |
| MVME327A           | 4.23     | 4.59 | -         | -    | -         | -    |
| MVME717            | -        | -    | -         | -    | -         | -    |

12.5.2 Connections



Passive terminator MVME717

|                   |                                      |
|-------------------|--------------------------------------|
| TYPE              | 4116-003 221/331 (220/330 $\Omega$ ) |
| Nr. OF PINS       | 16 (DIP)                             |
| Nr. OF RNW/DEVICE | 2                                    |

## 12.6 MVME328-1/2 SCSI Adapter Board

The MVME328 is available in the the thru-hole and SMD (Surface Mounted Devices) versions:

- MVME328-1 Single channel, single-ended SCSI adapter
- MVME328-1 Single channel, differential SCSI adapter Not released
- MVME328-2 Dual channel, single-ended SCSI adapter
- MVME328-2 Dual channel, differential SCSI adapter Not released

To be able to connect the SCSI cable the MVME328 needs the MVME328P2 paddle board (the P2 adapter board).

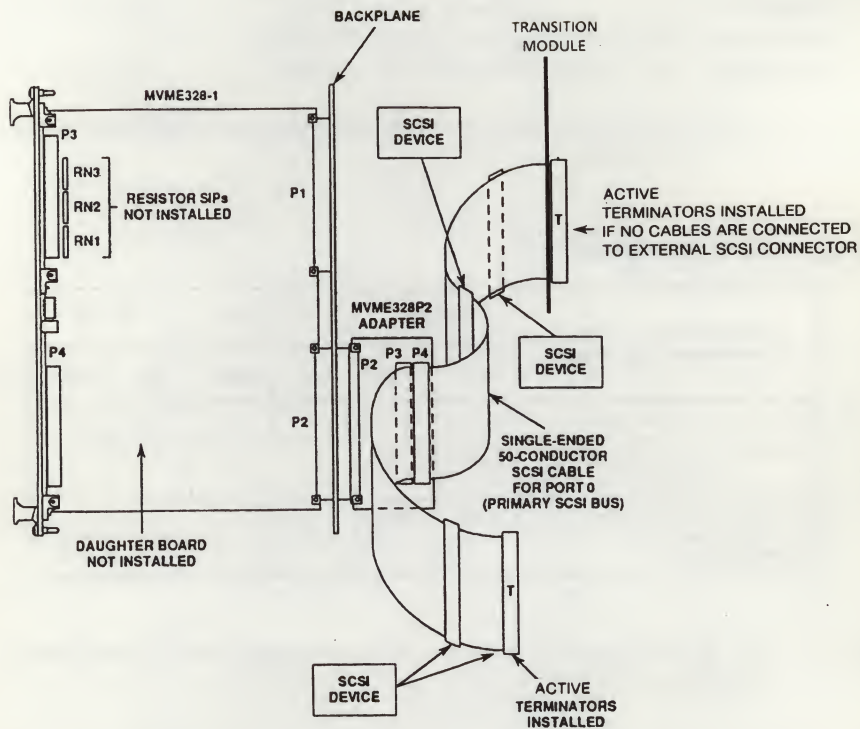
### 12.6.1 Characteristics

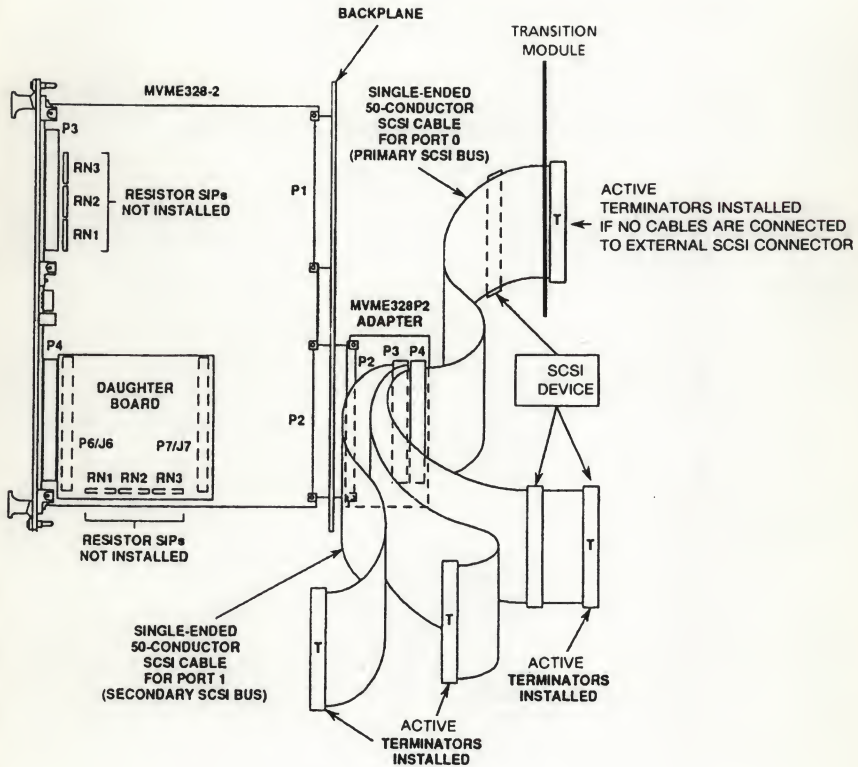
| Power Requirements<br>Single-ended SCSI adapter | + 5 Volt |       | + 12 Volt |      | - 12 Volt |      |
|-------------------------------------------------|----------|-------|-----------|------|-----------|------|
|                                                 | typ.     | max.  | typ.      | max. | typ.      | max. |
| MVME328-1 mother board                          | 4.67A    | 6.85A | -         | -    | -         | -    |
| MVME328-2 (with daughter board)                 | 5.42A    | 8.10A | -         | -    | -         | -    |
| MVME328 daughter board                          | 0.75A    | 1.25A | -         | -    | -         | -    |
| MVME328P2                                       | -        | -     | -         | -    | -         | -    |

Remark: The power requirements for the thru-hole and the SMD versions of the MVME328 are the same.



## 12.6.2 Connections



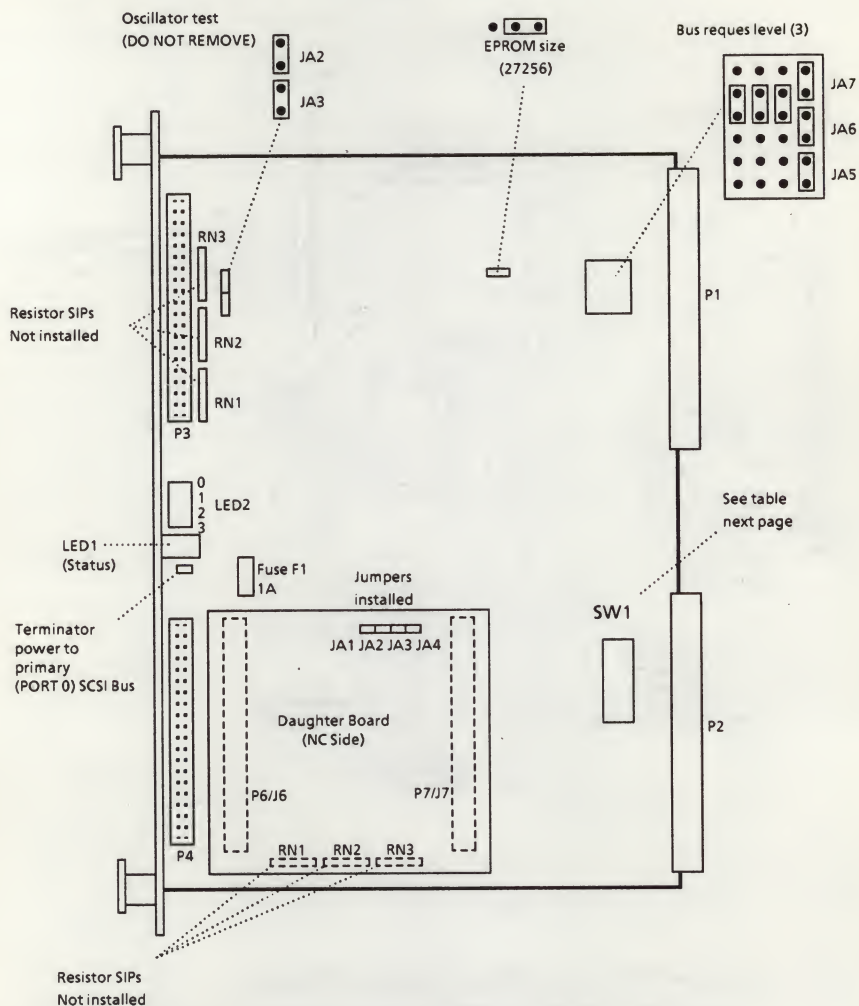


Passive terminators normally not installed (onboard)

|                   |                             |
|-------------------|-----------------------------|
| TYPE              | 8X-4-22-221/331 (220/330 Ω) |
| Nr. OF PINS       | 8 (SIP)                     |
| Nr. OF RNW/DEVICE | 3                           |

## 12.6.3 Strap Settings

### Strapping for the MVME328 thru-hole version



**NOTE:** MVME328-2 is an MVME328-1 with Daughter board

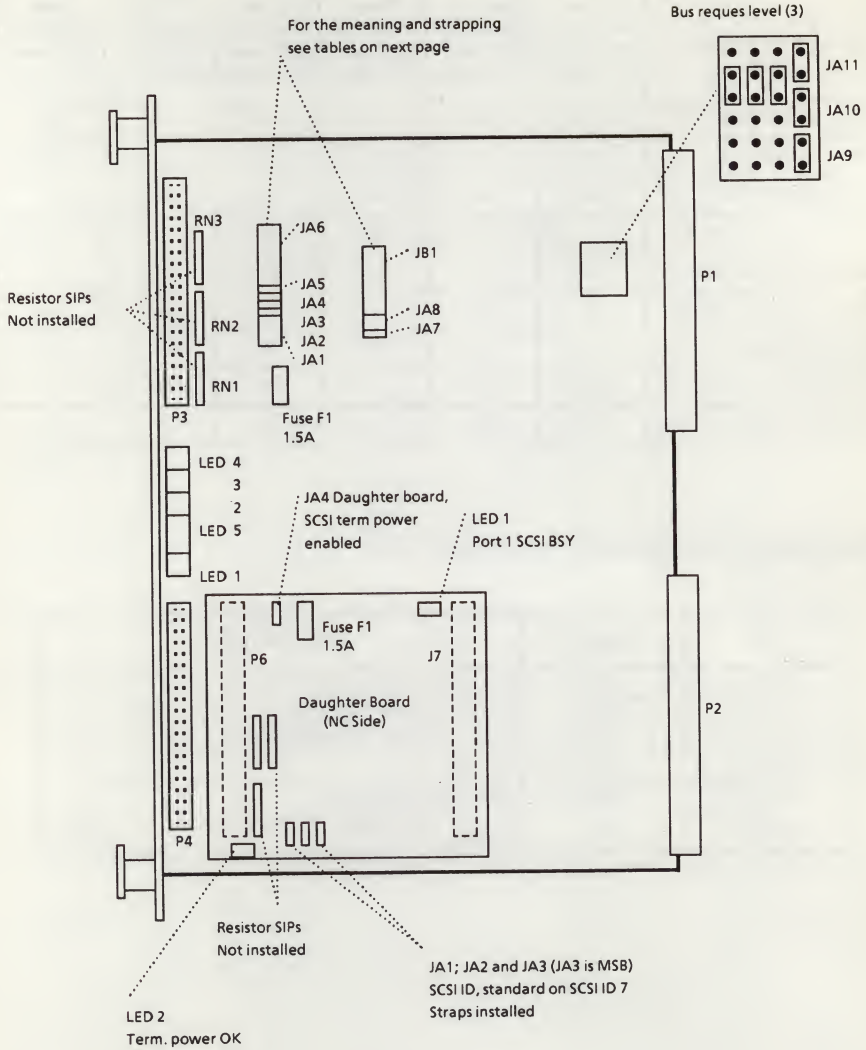
| SW1 setting                  | First<br>MVME328<br>SIO addr<br>FFFF9000 | Second<br>MVME328<br>SIO addr<br>FFFF9800 | Third<br>MVME328<br>SIO addr<br>FFFF4800 | Fourth<br>MVME328<br>SIO addr<br>FFFF5800 | Fifth<br>MVME328<br>SIO addr<br>FFFF7000 | Sixth<br>MVME328<br>SIO addr<br>FFFF7800 |
|------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|------------------------------------------|
| SW1-1 SCSI ID 2 <sup>0</sup> | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |
| SW1-2 SCSI ID 2 <sup>1</sup> | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |
| SW1-3 SCSI ID 2 <sup>2</sup> | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |
| SW1-4 SIO addr. bit A11      | On                                       | Off                                       | Off                                      | Off                                       | On                                       | Off                                      |
| SW1-5 SIO addr. bit A12      | Off                                      | Off                                       | On                                       | Off                                       | Off                                      | Off                                      |
| SW1-6 SIO addr. bit A13      | On                                       | On                                        | On                                       | On                                        | Off                                      | Off                                      |
| SW1-7 SIO addr. bit A14      | On                                       | On                                        | Off                                      | Off                                       | Off                                      | Off                                      |
| SW1-8 SIO addr. bit A15      | Off                                      | Off                                       | On                                       | On                                        | On                                       | On                                       |
| SW1-9 SIO addr. modifier     | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |

#### LEDs Indication on the thru-hole MVME328-1/2

| LED    | COLOR | EXPLANATION                                                        |
|--------|-------|--------------------------------------------------------------------|
| LED1-0 | red   | Is lit when VMEbus BBSY* signal is active                          |
| LED1-1 | red   | Is lit when MVME328 is driving VMEbus BBSY*                        |
| LED1-2 | red   | Is lit when Port 0 SCSI BSY* signal is active                      |
| LED1-3 | red   | Not used                                                           |
| STATUS | green | When green, board OK                                               |
| STATUS | red   | Is lit red when board currently being reset or if board has failed |



## Strapping for the MVME328 SMD version



**NOTE:** MVME328-2 is an  
MVME328-1 with  
Daughter board

## **Straps and LEDs on the MVME328 Daughter board (SMD version)**

For the strapping and the meaning of the LEDs, see drawing on previous page.

### **Meaning and setting of the straps on the MVME328 SMD version**

#### **JA1 and JA2 Oscillator speed, do not change**

Factory set to 33.33MHz (osc 1) and 28.302 MHz (osc 2).

#### **JA3 Terminator power**

Present, means terminator power is on.

#### **JA4 Late release**

Strap is off, late release.

#### **JA5 Software switch, reserved**

#### **JA6 Software switch**

|      |    |                                      |
|------|----|--------------------------------------|
| 1-16 | on | Reserved                             |
| 2-15 | on | Reserved                             |
| 3-14 | on | Reserved                             |
| 4-13 | on | Reserved                             |
| 5-12 | on | Reserved                             |
| 6-11 | on | Reserved                             |
| 7-10 | on | Disable extended power up diagnostic |
| 8-9  | on | SCSI reset on power up               |

#### **JA7 DTACK signal, do not change**

Strap is off, no noise on VMEbus DTACK.

#### **JA8 EPROM selection, do not change**

27256 EPROM selected.

#### **JA9, JA10, and JA11 Bus request/Grant selection, do not change**

#### **JB1, see table below**

Strap 'Off' means a logic '1'.

| JB1 setting                     | First<br>MVME328<br>SIO addr<br>FFFF9000 | Second<br>MVME328<br>SIO addr<br>FFFF9800 | Third<br>MVME328<br>SIO addr<br>FFFF4800 | Fourth<br>MVME328<br>SIO addr<br>FFFF5800 | Fifth<br>MVME328<br>SIO addr<br>FFFF7000 | Sixth<br>MVME328<br>SIO addr<br>FFFF7800 |
|---------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|------------------------------------------|
| JB1 1-18 SCSI ID 2 <sup>2</sup> | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |
| JB1 2-17 SCSI ID 2 <sup>1</sup> | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |
| JB1 3-16 SCSI ID 2 <sup>0</sup> | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |
| JB1 4-15 SIO addr. bit<br>A11   | On                                       | Off                                       | Off                                      | Off                                       | On                                       | Off                                      |
| JB1 5-14 SIO addr. bit<br>A12   | Off                                      | Off                                       | On                                       | Off                                       | Off                                      | Off                                      |
| JB1 6-13 SIO addr. bit<br>A13   | On                                       | On                                        | On                                       | On                                        | Off                                      | Off                                      |
| JB1 7-12 SIO addr. bit<br>A14   | On                                       | On                                        | Off                                      | Off                                       | Off                                      | Off                                      |
| JB1 8-11 SIO addr. bit<br>A15   | Off                                      | Off                                       | On                                       | On                                        | On                                       | On                                       |
| JB1 9-10 Supervisor<br>mode     | Off                                      | Off                                       | Off                                      | Off                                       | Off                                      | Off                                      |

#### LEDs Indication on the MVME328-1/2 SMD version

| LED         | COLOR | EXPLANATION                                                        |
|-------------|-------|--------------------------------------------------------------------|
| LED1        | red   | Is lit when SCSI port 0 BSY* signal is active                      |
| LED2        | red   | Is lit when MVME328 is driving VMEbus BBSY*                        |
| LED3        | red   | Is lit when VMEbus signal BBSY* is active                          |
| LED4        | red   | Is lit when terminator power is OK                                 |
| LED5 STATUS | green | When green, board OK                                               |
| LED5 STATUS | red   | Is lit red when board currently being reset or if board has failed |

#### **12.6.4 Installation**

For the installation and positioning rules see chapter 2.

#### **12.6.5 Maintenance**

For the tests and the diagnostics see chapter 3.

The MVME328-1/2 has a built-in self test, this test is started at power-up.

The MVME328-1/2 can be tested using the processor debugger and diagnostics, and also via the SSID tests.





## 13 TAPE CONTROL UNITS

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| 1: Technical Data | 13.1-1 |
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| 2: MVME350 | 13.2-1 | 13.2-1 | 13.2-2 | 13.2-4 | 13.2-4 |
| 3: MVME355 | 13.3-1 | 13.3-1 | 13.3-4 | 13.3-6 | 13.3-6 |

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|---|-----------------|---|--|--|--|
| 1 | Characteristics | ↑ |  |  |  |
| 2 | Connections     | ↑ |  |  |  |
| 3 | Strap Settings  | ↑ |  |  |  |
| 4 | Installation    | ↑ |  |  |  |
| 5 | Maintenance     | ↑ |  |  |  |

**NOTE:** *n.a. means that this section is not available for this unit.*

**ATTENTION:** *MVME327A and MVME328-1/2 (SCSI-Adapters) can be found in chapter 12.*



## 13.1 TECHNICAL DATA

|                    | MVME350                 | MVME355                              |
|--------------------|-------------------------|--------------------------------------|
| Tape Interface     | QIC-02                  | Pertec                               |
| Devices            | Archive Streamer, 5.25" | Cipher, $\frac{1}{2}$ " 9 track tape |
| Number of Devices  | Max. 1                  | Max. 1                               |
| Power Requirements | + 5V, 3A (3.5A max.)    | + 5V, 6A (max.)                      |





## 13.2 MVME350

### 13.2.1 Characteristics

For the characteristics see section 12.1.

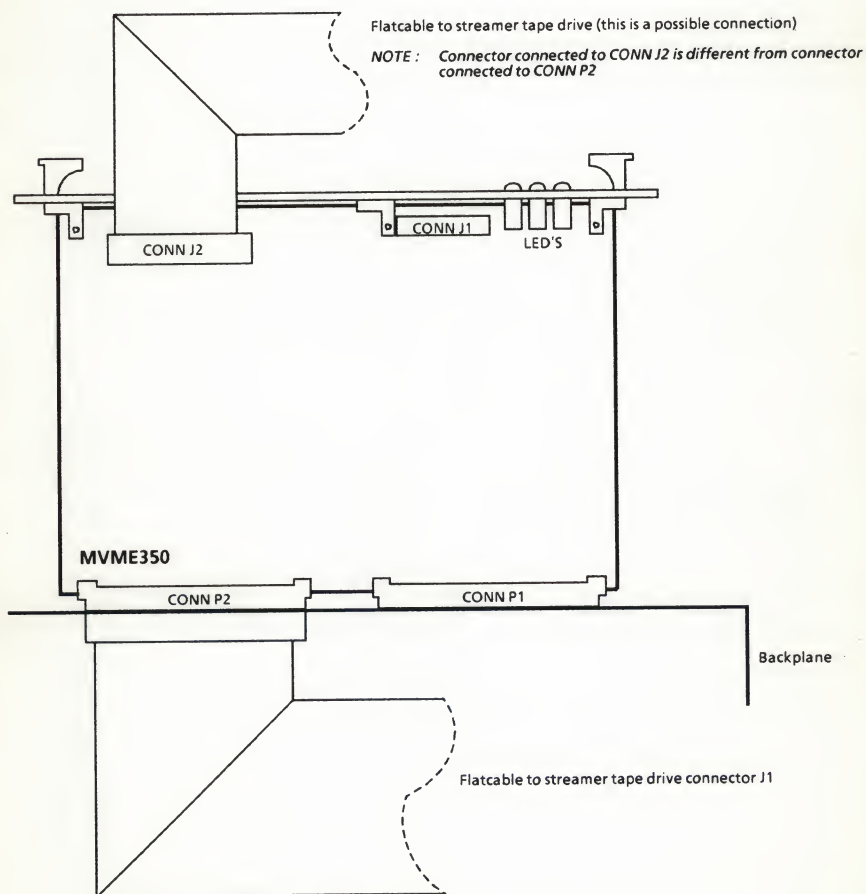
### 13.2.2 Connections

P1 connector for the connection to the VME bus .

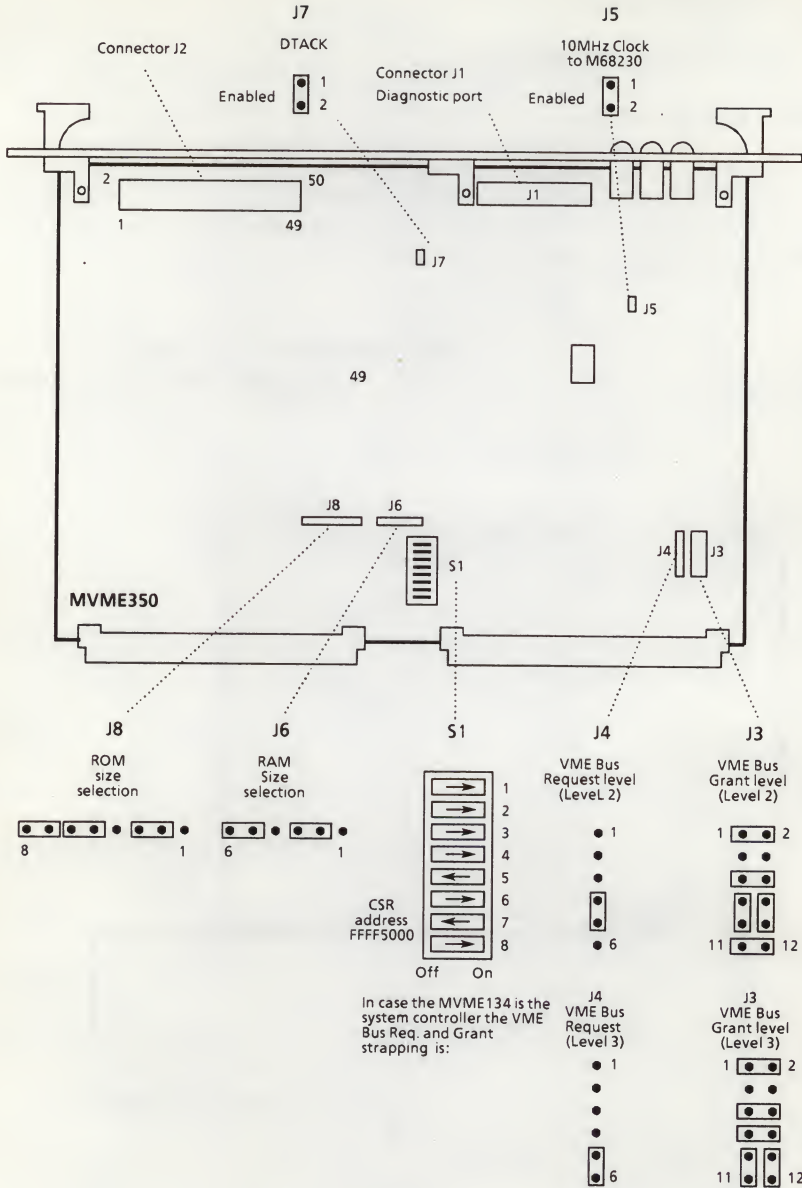
P2 connector (middle row) contains the QIC-02 interface.

J2 connector (QI-02) can be used for connecting the streamer tape drive (old situation).

J1 connector for the diagnostic port, not used.

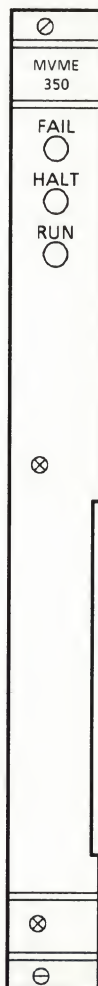


### 13.2.3 Strap Setting



# LED's on the MVME350

| LED  | FUNCTION                                                                                 | ACTION                                                                |
|------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| FAIL | This LED normally indicates a problem on the VME board itself.                           | Run a processor program to test the board                             |
| HALT | This LED indicates that the M68010 microprocessor is halted, or the board is reset.      | Press the reset button, or run a processor program to test the board. |
| RUN  | This LED is normally ON, and indicates that the ONLINE signal is sent to the tape drive. |                                                                       |



X2568



### **13.2.4 Installation**

For the installation and the positioning rules see chapter 2.

### **13.2.5 Maintenance**

For the tests and diagnostics see chapter 3.

The MVME350 has a built-in self test, this test is started at power-up.

The MVME350 can also be tested using the processor debugger and diagnostics, and via the SSID tests.

### **13.3 MVME355**

The MVME355 is End Commercial Delivery

### **13.3 Characteristics**

For the characteristics see section 13.1.

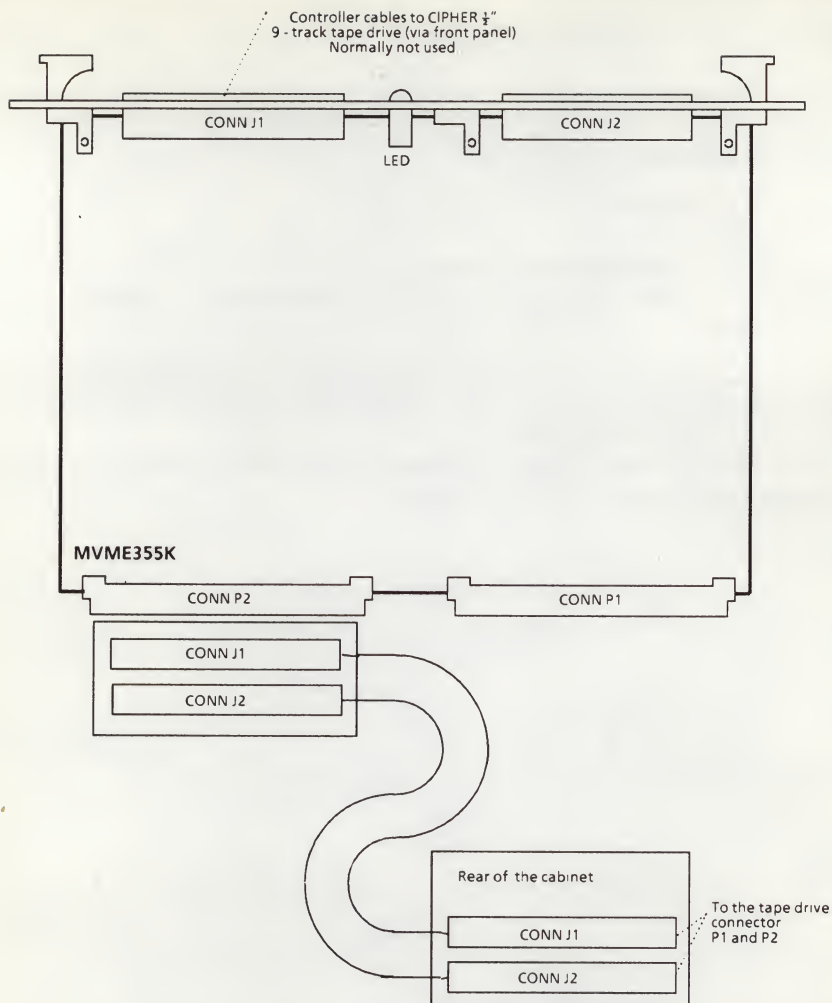
#### **13.3.2 Connections**

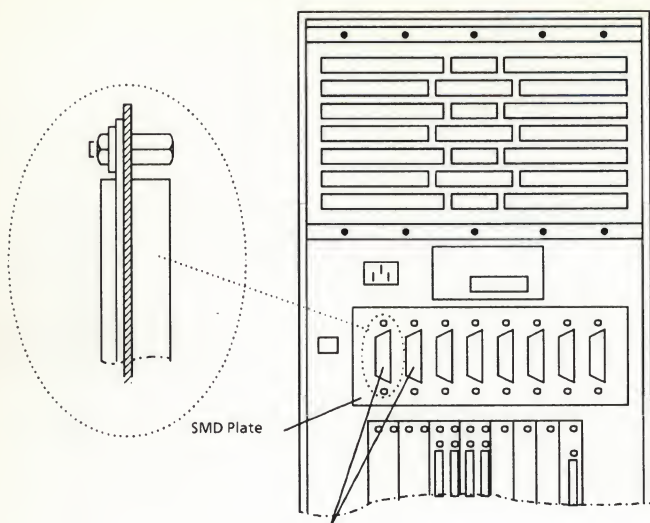
P1 connector for the MVME-bus connection.

P2 connector (middle row) contains the PERTEC interface (for connection of the Tape P2 Paddle board).

From the connectors J1 and J2 on the Tape P2 Paddle board, two cables are running to the two connectors at the rear of the cabinet. These connectors have to be mounted in the cabinet during initial installation.

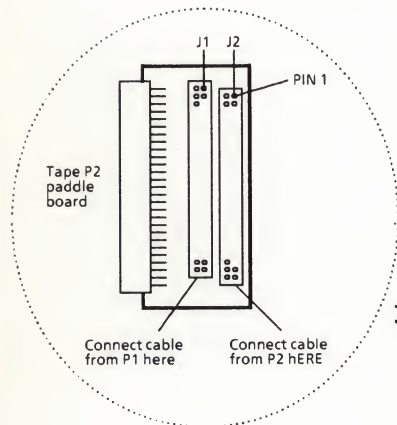
The tape drive has to be hooked up to these two connectors at the rear of the cabinet, connector 1 to connector 1 of the tape drive.





SMD Plate

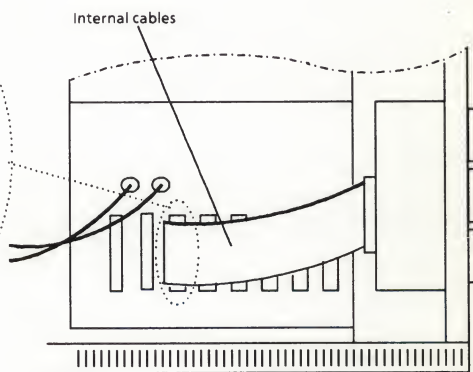
Connectors for controller  
cables to CIPHER 1/2" 9-Track  
tape drive (via backpanel)



Tape P2  
paddle  
board

Connect cable  
from P1 here

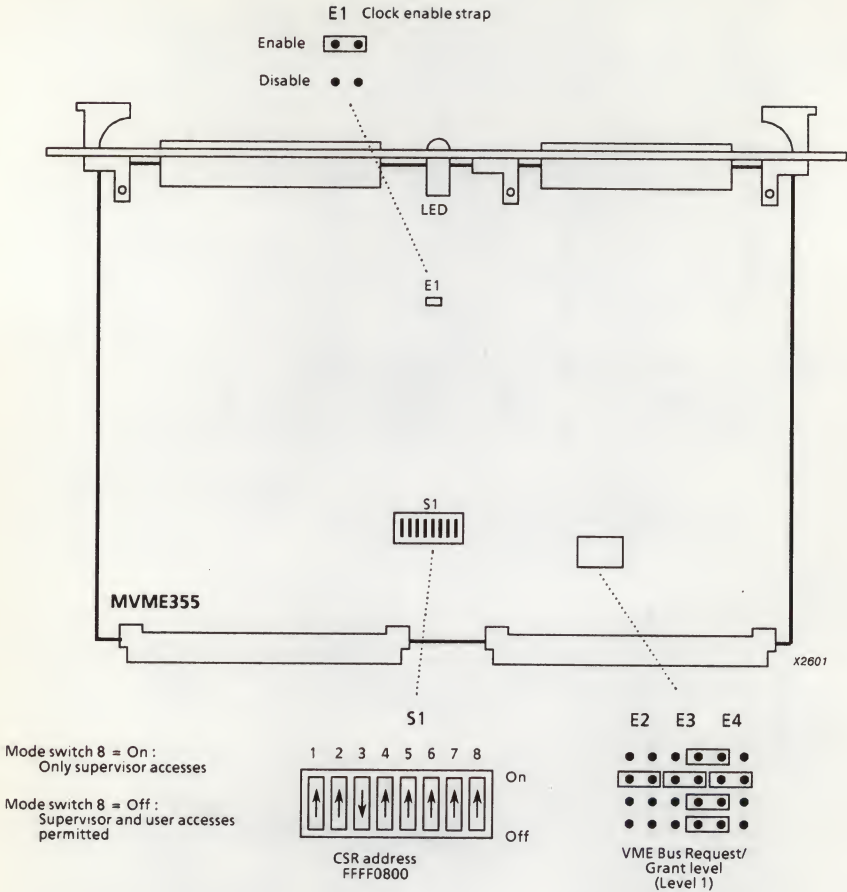
Connect cable  
from P2 hERE



X2614

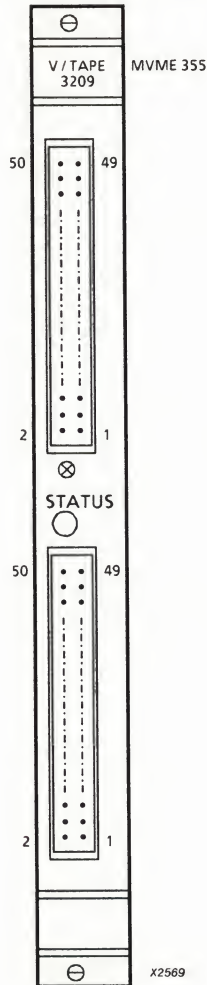


13.3.3 Strap Settings



# LEDs on the MVME355

| LED    | FUNCTION                                                                                                                                                                                        | ACTION                                                                |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Status | This LED indicates the status of the MVME355                                                                                                                                                    |                                                                       |
|        | <p>If green: - board is initialized by CPU, and<br/>- no board-detected faults are present</p> <p>If red: - board is not initialized by CPU, and/or<br/>- board detected faults are present</p> | Press the reset button or run a processor debugger to test the board. |



### **13.3.4 Installation**

For the installation and the positioning rules see chapter 2.

### **13.3.5 Maintenance**

For the tests and diagnostics see chapter 3.

The MVME355 has a built-in selft test, this test is started at power-up.

The MVME355 can also be tested using the processor debugger and diagnostics, and via the SSID test

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| 1.1 Technical Data Control Units | 15.1-1 |
| 1.2 MVME330A/B Protocol Types    | 15.1-5 |
| 1.3 V.24 Reference Data          | 15.1-6 |

|                      |         |         |         |         |         |
|----------------------|---------|---------|---------|---------|---------|
| 2: MVME330A/B        | 15.2-1  | 15.2-1  | 15.2-3  | 15.2-5  | 15.2-5  |
| 3: MVME332           | 15.3-1  | 15.3-1  | 15.3-2  | 15.3-4  | 15.3-4  |
| 4: MVME332XT         | 15.4-1  | 15.4-1  | 15.4-2  | 15.4-5  | 15.4-5  |
| 5: MVME333-2         | 15.5-1  | 15.5-1  | 15.5-2  | 15.5-8  | 15.5-8  |
| 6: MVME333X25        | 15.6-1  | 15.6-1  | 15.6-3  | 15.6-14 | 15.6-15 |
| 7: MVME335           | 15.7-1  | 15.7-1  | 15.7-3  | 15.7-5  | 15.7-5  |
| 8: MVME336/SYS336M16 | 15.8-1  | 15.8-1  | 15.8-2  | 15.8-5  | 15.8-6  |
| 9: MVME374           | 15.9-1  | 15.9-1  | 15.9-2  | 15.9-5  | 15.9-5  |
| 10: MVME338          | 15.10.1 | 15.10.1 | 15.10.5 | 15.10.9 | 15.10.9 |
| 11: MVME376          | 15.11.1 | 15.11.1 | 15.11.2 | 15.11.4 | 15.11.4 |

Subsection:

|   |                 |   |
|---|-----------------|---|
| 1 | Characteristics | ↑ |
| 2 | Connections     | ↑ |
| 3 | Strap Settings  | ↑ |
| 4 | Installation    | ↑ |
| 5 | Maintenance     | ↑ |

**NOTE:** *n.a. means that this section is not available for this unit.*





## 15.1 TECHNICAL DATA

### 15.1.1 Technical Data Control Units

| Card Name                              | MVME332                                                | MVME332XT                                                                             | MVME335                                                                             |
|----------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Type of Protocol                       | Asynchronous                                           | Asynchronous                                                                          | Asynchronous                                                                        |
| Peripheral Interface                   | RS232C                                                 | RS232C<br>Centronics                                                                  | RS232C<br>Centronics                                                                |
| Connection of<br>Peripherals to        | MVME710<br>transition board                            | MVME710<br>transition board                                                           | MVME715P<br>transition board                                                        |
| Max. Number of<br>Boards or Board sets | P9070: 4<br>P9050: 1                                   | P9070: 4<br>P9050: 2*<br>P9090: 8                                                     | P9030: 1<br>P9050: 1<br>P9070: 2<br>P9090: -                                        |
| Performance                            | 8 Channels<br>simultan.<br>full duplex at<br>9600 baud | 8 Channels<br>simultan.<br>full duplex at<br>38.400 baud<br>1 Centronics par.<br>port | 4 Channels<br>simultan.<br>full duplex at<br>9600 baud<br>1 Centronics par.<br>port |
| Indicators                             | Fail LED on the<br>front panel (red)                   | Fail LED (red)<br>Halt LED (red)<br>Run LED (green)<br>on the front panel             |                                                                                     |
| Power Requirements<br>+ 5V             | 3.5A (typ)<br>4.2A (max)                               | 4.2A (typ)<br>4.7A (max)                                                              | 1.5A (typ)<br>2.1A (max)                                                            |
| + 12V                                  | 140mA (typ)<br>200mA (max)                             | 50mA (typ)<br>100mA (max)                                                             | 55mA (typ)<br>75mA (max)                                                            |
| - 12V                                  | 140mA (typ)<br>200mA (max)                             | 50mA (typ)<br>100mA (max)                                                             | 55mA (typ)<br>75mA (max)                                                            |
| Test Programs                          | SSID                                                   | SSID                                                                                  | SSID                                                                                |
| Remarks                                | MVME332 is End<br>of Commercial<br>Delivery            |                                                                                       |                                                                                     |

\* In P9050 models 004-007 only 1.

| Card Name                              | MVME336 (Hub)                                                                                                                        | MVME338                                                                                                                                                      |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of Protocol                       | MVME336:<br>X25 HDLC<br><br>SYS336M16:<br>Asynchronous                                                                               | 2.5Mbit, high<br>impedance, token<br>passing interface                                                                                                       |
| Peripheral Interface                   | MVME336:<br>SYS336M16: RS-232C                                                                                                       |                                                                                                                                                              |
| Connection of<br>Peripherals to        | MVME751-SYS336M16<br>SYS336M16-serial<br>devices                                                                                     | Transition module and<br>RG-62 coax to cluster<br>controllers and or<br>repeaters.                                                                           |
| Max. Number of<br>Boards or Board sets | P9030: 1<br>P9050: 1<br>P9070: 1<br>P9090: 1                                                                                         | P9030: 1<br>P9050: 4*<br>P9070: 4*<br>P9090: 4*                                                                                                              |
| Performance                            | MVME336:6 channels<br>simultan full duplex 1.0<br>Mbits sec.<br>SYS336M16:<br>16 channels simultan.<br>half duplex at 19.200<br>baud | One MVME338 supports<br>max 64 terminals. 4<br>MVME338 are<br>supported<br>Max throughput<br>MVME338 44,000 cps.<br>Max throughput Term<br>Server 25,000 cps |
| Indicators                             | Run LED (green)<br>Firmware operation<br>LED (yellow) on<br>SYS336M16 connection<br>panel                                            | Tri-color status LED                                                                                                                                         |
| Power Requirements<br>+ 5V             | 4.3A (typ)<br>7.0A (max)                                                                                                             | --<br>5.5A (max)                                                                                                                                             |
| + 12V                                  | --<br>--                                                                                                                             | --<br>--                                                                                                                                                     |
| - 12V                                  | --<br>--                                                                                                                             | --<br>125mA (max)                                                                                                                                            |
| Test Programs                          | SSID                                                                                                                                 | SSID                                                                                                                                                         |

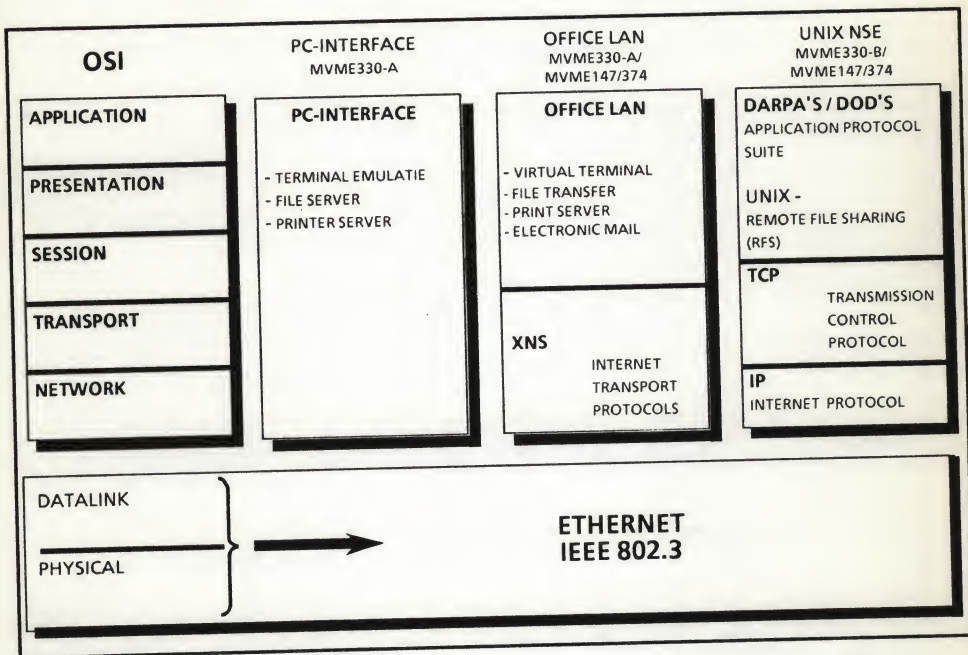
\* If slots are available

| Card Name                                            | MVME330A/B                                                       | MVME374                                                                                    | MVME376                                      |
|------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------|
| Type of Protocol                                     | MVME330A (XNS)<br><br>MVME330B (TCP/IP)<br>(See section 15.1.2.) | ETHERNET and asynchronous serial debug port                                                | ETHERNET and asynchronous serial debug port  |
| Peripheral Interface                                 | Standard AUI to MAU (access unit interface)                      | AUI (802.3)                                                                                | AUI (802.3)                                  |
| Connection of Peripherals to                         | MAU (medium access unit)                                         | MAU                                                                                        | MAU                                          |
| Max. Number of Boards or Board sets                  | 1 per system                                                     | P9030: 1<br>P9050: 1<br>P9070: 6<br>P9090: 6                                               | P9030: 1<br>P9050: 1<br>P9070: 6<br>P9090: 6 |
| Performance                                          | 1 Channel (10Mbits/sec)                                          | 1 Channel 10Mbits/sec                                                                      | 1 Channel 10Mbits/sec                        |
| Indicators                                           | Fail LED (red)<br>Run LED (green)<br>on the front panel          | Green LED (+ 12V)<br>Red LED (FAIL)                                                        |                                              |
| Power Requirements<br>+ 5V<br><br>+ 12V<br><br>- 12V | --<br>3.8A (max)<br><br>--<br>0.6A (max)<br><br>--<br>--         | 4.5A (typ)<br>4.9A (max)<br><br>360mA (typ)<br>400mA (max)<br><br>40mA (typ)<br>50mA (max) | 31.0 Watt max.                               |
| Test Programs                                        | SSID                                                             | SSID (Rel. 5.1)                                                                            | SSID (Rel. 7.2 or 2.2)                       |
| Remarks                                              | The MVME330 boards are End of Commercial Delivery                |                                                                                            |                                              |



| Card Name                           | MVME333-2                                                                        | MVME333X25                                        |
|-------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------|
| Type of Protocol                    | Asynchronous and synchronous byte or bit oriented, monosync, bisync or SDLC/HDLC | X25/HDLC                                          |
| Peripheral Interface                | RS232C or RS422B                                                                 | RS232C V35                                        |
| Connection of Peripherals to        | MVME705A/B/705-1 transition board                                                | MVME705A/B/705-1 transition board                 |
| Max. Number of Boards or Board sets | P9070: 2<br>P9050: 2<br>P9090: 2                                                 | P9030: 1<br>P9050: 1<br>P9070: 1<br>P9090: 1      |
| Performance                         | 6 Channels simultan. full duplex                                                 | 2 Channels simultan. full duplex (max. 64Kb/sec.) |
| Indicators                          | Fail LED on the front panel (red)                                                | Fail LED on the front panel (red)                 |
| Power Requirements                  |                                                                                  |                                                   |
| +5V                                 | 3.8A (typ)<br>4.5A (max)                                                         | 3.8A (typ)<br>4.4A (max)                          |
| + 12V                               | --<br>--                                                                         | --<br>--                                          |
| - 12V                               | --<br>--                                                                         | --<br>--                                          |
| Test Programs                       | SSID                                                                             | SSID                                              |

## 15.1.2 Board Software Support



X3562

### 15.1.3 V.24 Reference Data

| PIN<br>ASSIGN. | SIGNAL NAMES   |              |              |              |                | DIRECTION<br>(TO/<br>FROM<br>DTE) | DESCRIPTION<br><br>DTE = TERMINAL<br>DCE = MODEM         |
|----------------|----------------|--------------|--------------|--------------|----------------|-----------------------------------|----------------------------------------------------------|
|                | CCITT<br>V.24  | EIA<br>RS232 | EIA<br>RS449 | DIN<br>66020 | LIT.<br>FRANC. |                                   |                                                          |
| 1              | 101            | AA           | - -          | E1           | TP             | to/from                           | Protective Ground Shield                                 |
| 7              | 102            | AB           | SG           | E2           | TS             | to/from                           | Signal Ground Common Return                              |
| 2              | 103            | BA           | SD           | D1           | ED             | from                              | Transmitted Data                                         |
| 3              | 104            | BB           | RD           | D2           | RD             | to                                | Received Data                                            |
| 4              | 105            | CA           | RS           | S2           | DPE            | from                              | Request to Send                                          |
| 5              | 106            | CB           | CS           | M2           | PAE            | to                                | Ready for Sending                                        |
| 6              | 107            | CC           | DM           | M1           | PDP            | to                                | Data Set Ready                                           |
| 20<br>20       | 108/1<br>108/2 | - -<br>CD    | - -<br>TR    | S1.1<br>S1.2 | CPD<br>TDP     | from<br>from                      | Connect Data Set to Line<br>Data Terminal Ready          |
| 22             | 125            | CE           | IC           | M3           | IA             | to                                | Calling Indicator                                        |
| 8              | 109            | CF           | RR           | M5           | DP             | to                                | Received Line Signal Detector<br>(Data Carrier Detector) |
| 21             | 110            | CG           | SQ           | M6           | QSR            | to                                | Signal Quality Detector                                  |
| 23             | 111            | CH           | SR           | S4           | SDB            | from                              | Data Signal Rate Selector (DTE)                          |
| 23             | 112            | C1           | SI           | M4           | SDB            | to                                | Data Signal Rate Selector (DCE)                          |
| 11             | 126            | - -          | SF           | S5           | SFE            | from                              | Select Transmit Frequency                                |
| 24             | 113            | DA           | TT           | T1           | HEE/BTE        | from                              | Transmitter Signal Element<br>Timing (Clock from DTE)    |
| 15             | 114            | DB           | T            | T2           | HE (1)         | to                                | Transmitter Signal Element<br>Timing (Clock from DCE)    |
| 17             | 115            | DD           | RT           | T4           | HR             | to                                | Receiver Signal Element Timing                           |
| 14             | 118            | SBA          | SSD          | HD1          | ED5            | from                              | Secondary Transmitted Data                               |
| 16             | 119            | SBB          | SRD          | HD2          | RD5            | to                                | Secondary Received Data                                  |
| 19             | 120            | SCA          | SRS          | HS2          | DPE5           | from                              | Secondary Request to Send                                |
| 13             | 121            | SCB          | SCS          | HM2          | PAE5           | to                                | Secondary Clear to Send                                  |
| 12             | 122            | SCF          | SRR          | HM5          | DP5            | to                                | Secondary Carrier Detector                               |
| 9/10           |                |              |              |              |                |                                   | Reserved for Data Set Testing                            |
| 11/18/25       |                |              |              |              |                |                                   | Un-assigned                                              |
| 21             | 140            |              | RL           |              |                | from                              | Loop Back Maintenance Test                               |
| 18             | 141            |              | LL           |              |                | from                              | Local Loop Back                                          |
| 25             | 142            |              | TM           |              |                | to                                | Test Indicator                                           |

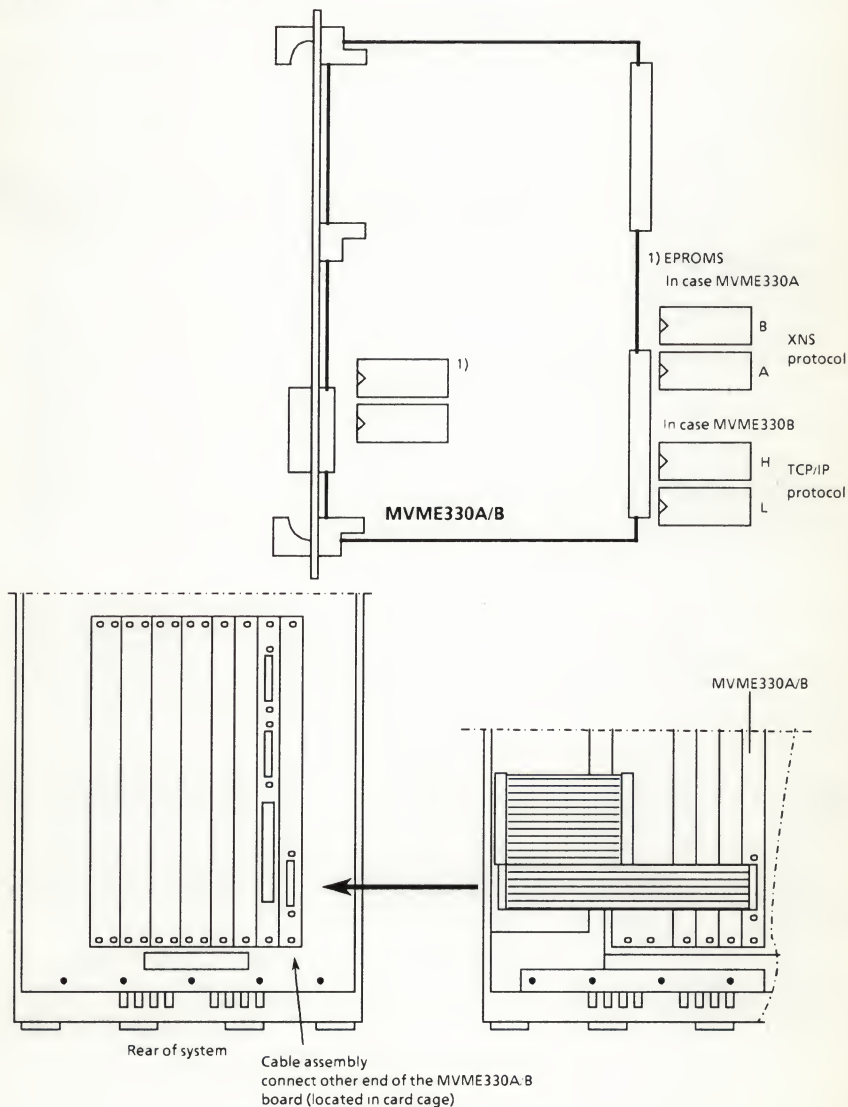
## 15.2 MVME330A/B

The MVME330A and the MVME330B are End of Commercial Delivery.

### 15.2.1 Characteristics

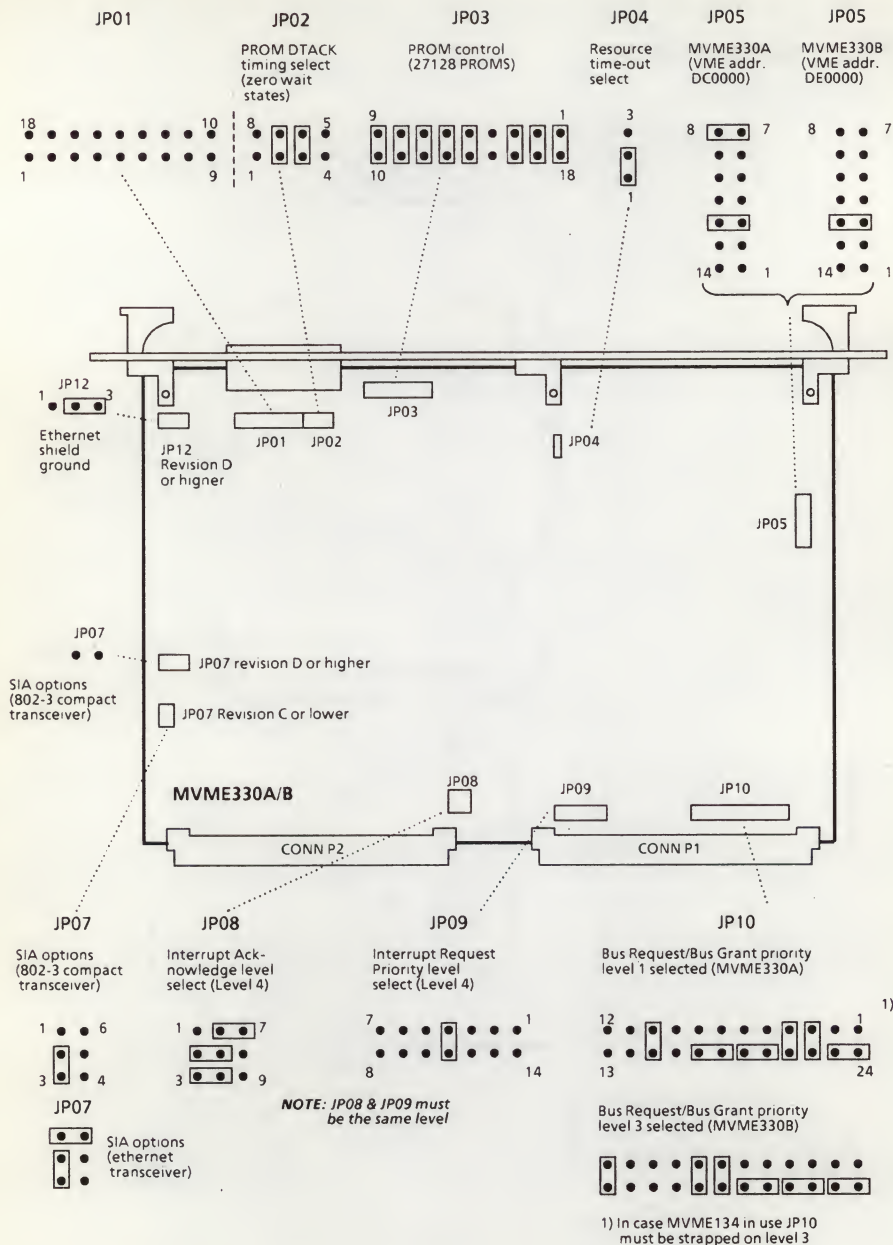
For the characteristics, see section 15.1.

### 15.2.2 Connections



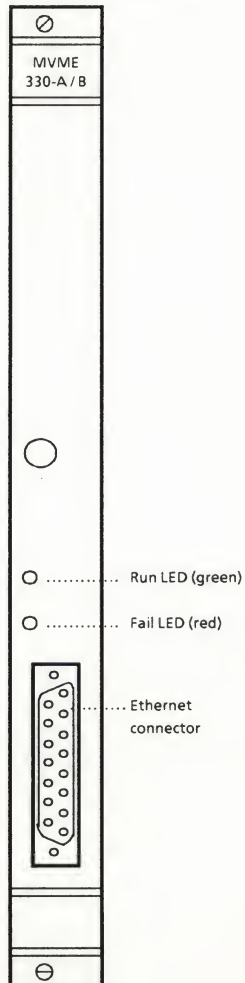


## 15.2.3 Strap Settings



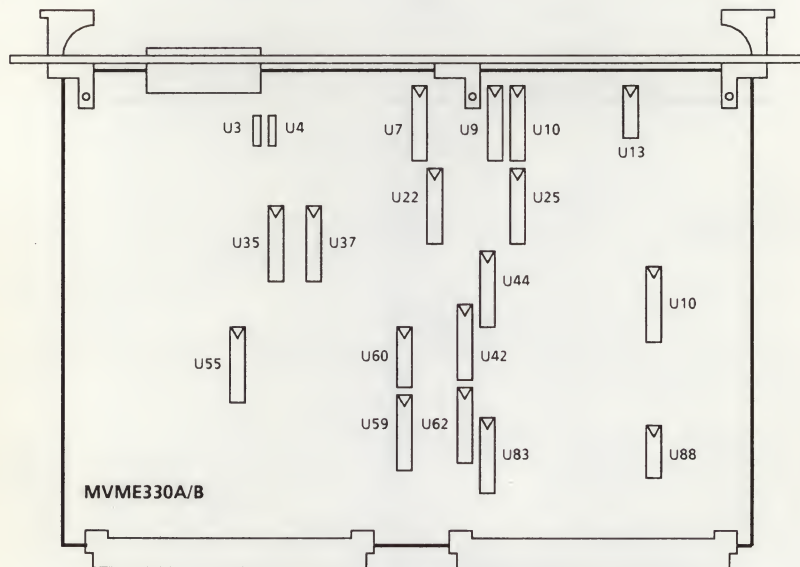
## LEDs on the MVME330A/B

| NAME | LED COLOUR | FUNCTION                             | REMARKS/ACTION                                                                                                               |
|------|------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| RUN  | Green      | Indicates a normal correct situation | On, during normal operation.<br>Off, during board self-test,<br>turned on after successful<br>completion of board self-test. |
| FAIL | Red        | Indicates an on-board problem.       | On, during board self-test,<br>turned off after successful<br>completion of board self-test.<br>Run: SSID-test(s).           |



### Firmware on the MVME330 boards

|           |        |              |    |
|-----------|--------|--------------|----|
| MVME330-A | PROM A | 51-AW4978B05 | U3 |
|           | PROM B | 51-AW4978B06 | U4 |
| MVME330-B | PROM H | KNL ROM10 H  | U4 |
|           | PROM L | KNL ROM10 L  | U3 |



## 15.2.4 Installation

For the installation and positioning rules for the MVME330A/B, see chapter 2.

When installing the MVME330A/B the software belonging to this board must be installed onto the system, to do this **read** and **use** the Software Release Guide.

### Removal

When the board has to be removed from the system it may be necessary to remove the software, belonging to the board, from the system, to do this use the Software Release Guide.

## 15.2.5 Maintenance

The MVME330A/B has a built-in self test, this test is started at power up.

The MVME330A/B can also be tested using the SSID.

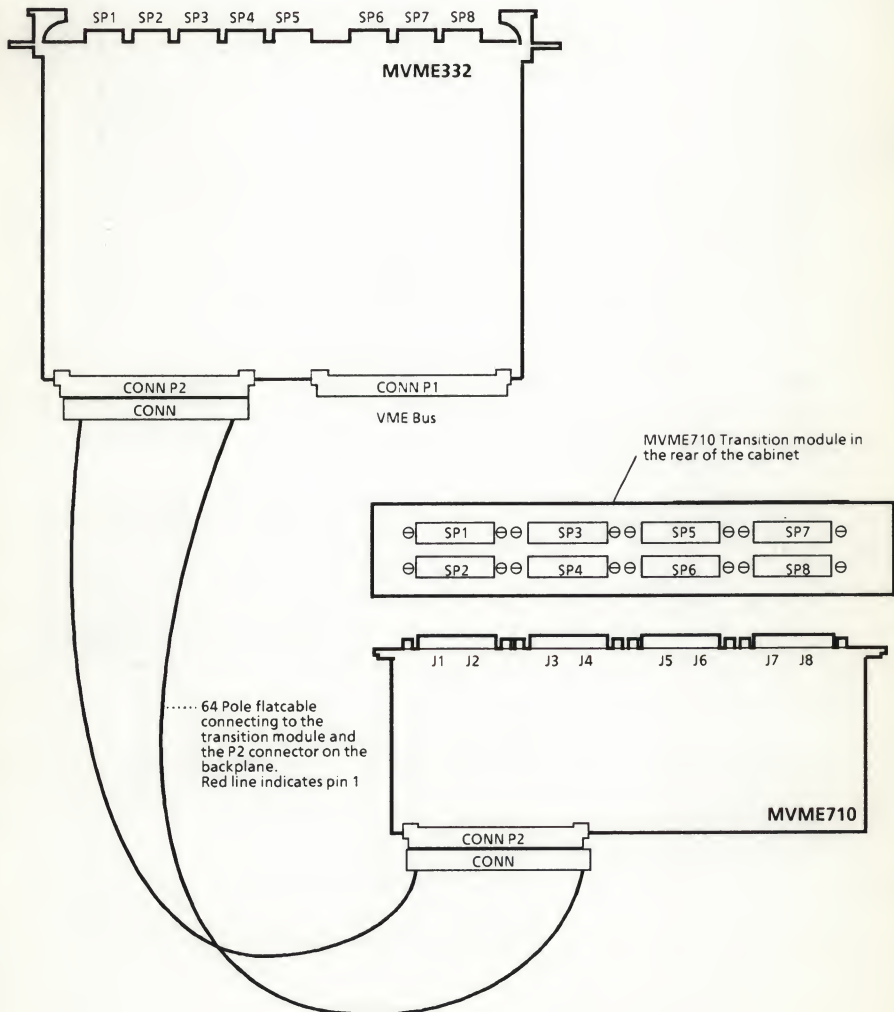
## 15.3 MVME332

The MVME332 is End Commercial Delivery.

### 15.3.1 Characteristics

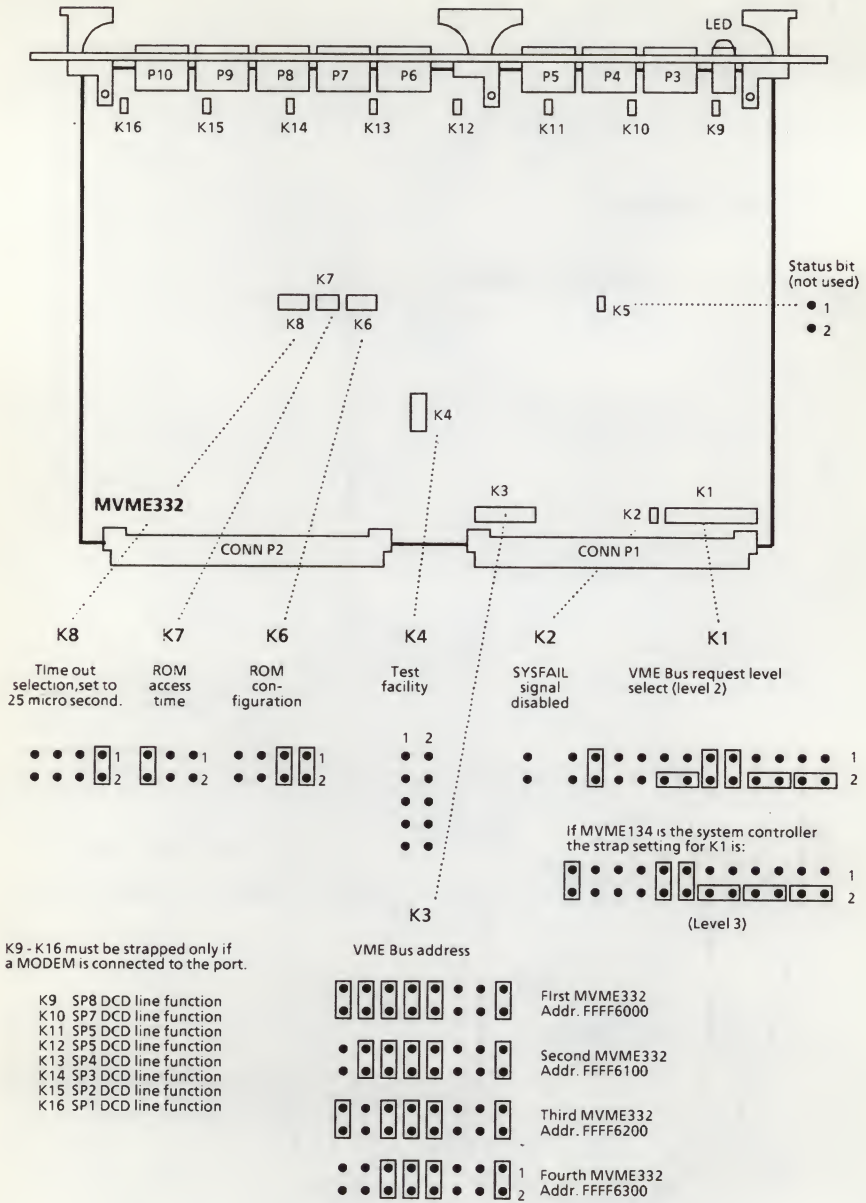
For the characteristics, see section 15.1.

### 15.3.2 Connections





15.3.3 Strap Settings



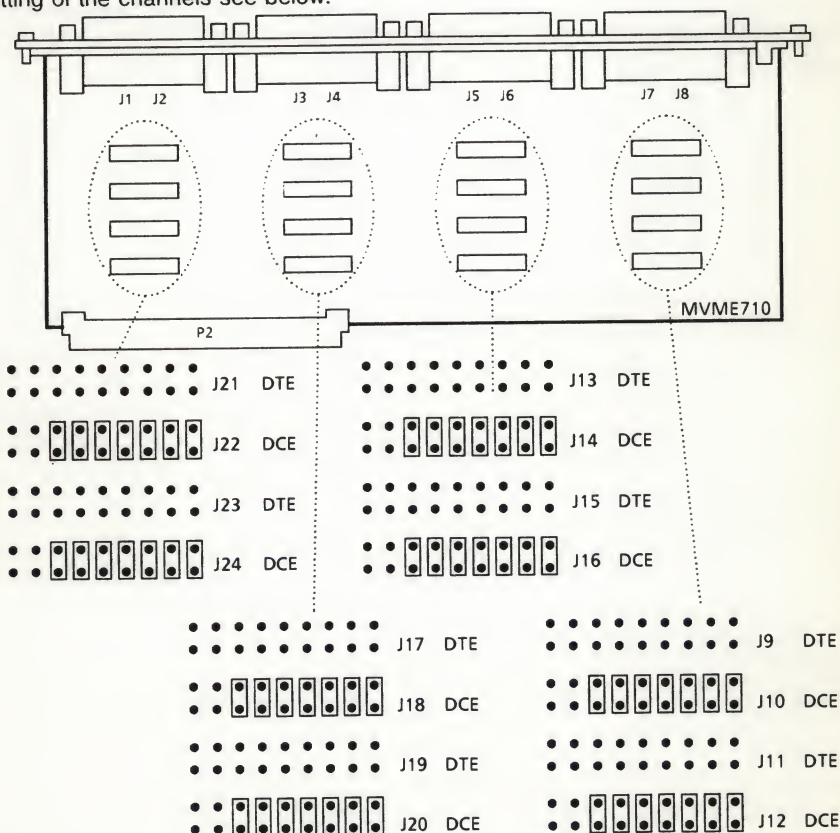
## LEDs on the MVME332

| LED  | FUNCTION                                                                                                                    | ACTION |
|------|-----------------------------------------------------------------------------------------------------------------------------|--------|
| FAIL | The LED is ON during the automatic board test and in case of a "FAIL" situation.<br>During normal operation the LED is OFF. |        |

## Straps on the MVME 332 Transition Module

Strapfield J9 and J10 belong to connector J7, channel SP7.  
 Strapfield J11 and J12 belong to connector J8, channel SP8.  
 Strapfield J13 and J14 belong to connector J5, channel SP5.  
 Strapfield J15 and J16 belong to connector J6, channel SP6.  
 Strapfield J17 and J18 belong to connector J3, channel SP3.  
 Strapfield J19 and J20 belong to connector J4, channel SP4.  
 Strapfield J21 and J22 belong to connector J1, channel SP1.  
 Strapfield J23 and J24 belong to connector J2, channel SP2.

For setting of the channels see below.



### 15.3.4 Installation

For the installation and positionings rules, see chapter 2.

After any change of the systems configuration concerning the serial I/O controllers, you must always run **/etc/portconfig -m** (in single user mode) to adapt the tty entries in the /dev directory.

The MVME710 transition module should be mounted in the rear of the cabinet, this transition module should be connected, via the delivered flat cable, to the P2 connector of the card slot used by the MVME332 board, see also section 15.3.2.

### 15.3.5 Maintenance

The MVME332 has a built-in self test, this test is started at power-up.

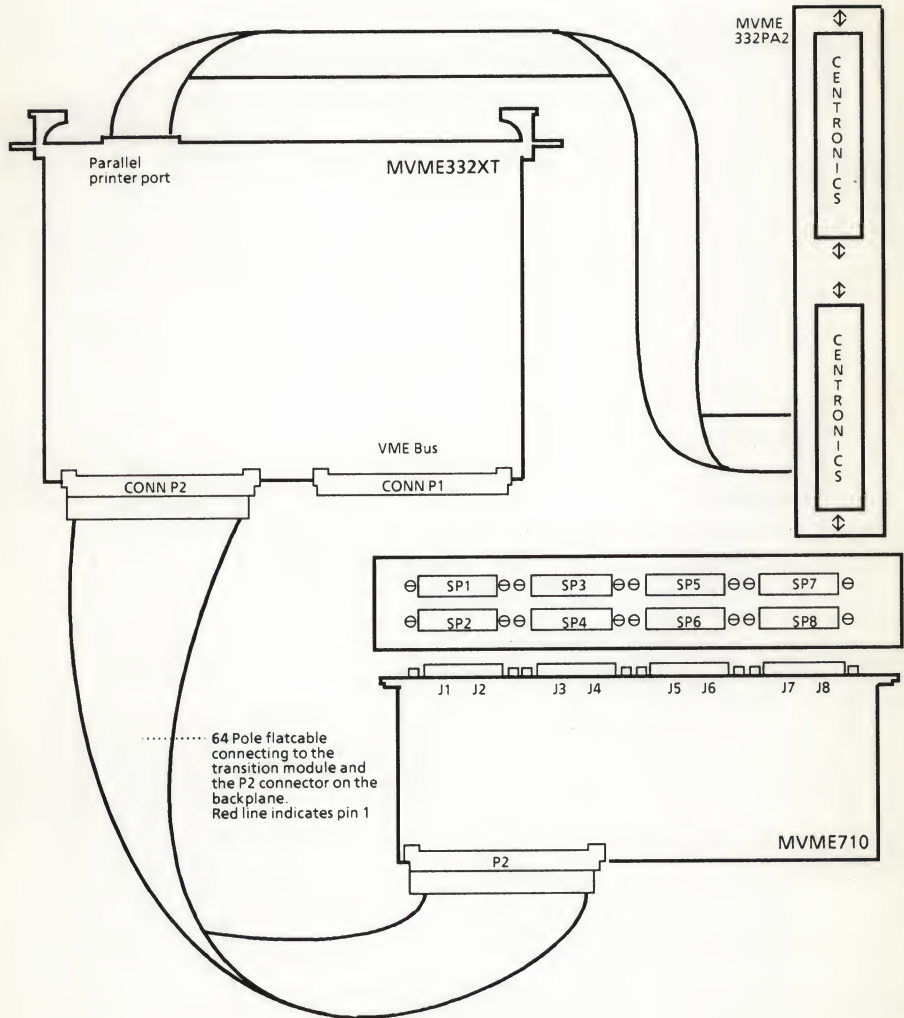
The MVME332 can also be tested via the SSID tests and via the Terminal and Printer Diagnostics. When testing via SSID, loop back cables on the transition board must be used.

## 15.4 MVME332XT

### 15.4.1 Characteristics

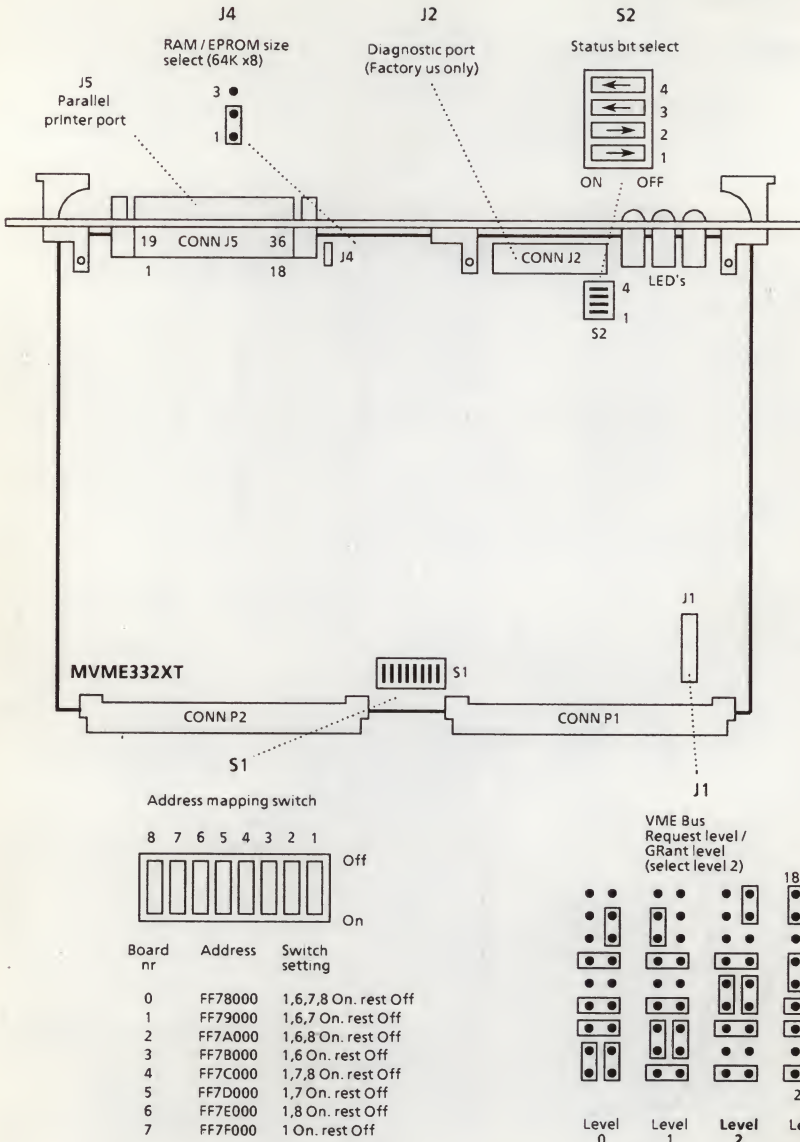
For the technical data see section 15.1.

### 15.4.2 Connections





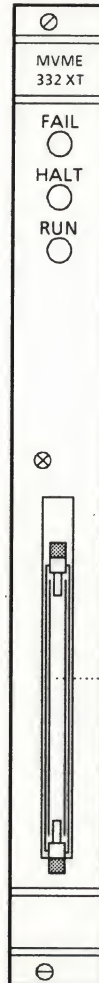
### 15.4.3 Strap Settings



**NOTE:** Jumper each MVME332XT at some Bus Request and Grant level not used by downstream MVME Bus controllers. For example, if the disk controller and tape controller are at Bus Request level 3 and 2 respectively, and are installed to the right of the MVME332XT(S), reprogram the MVME332XT(S) to level 0 or 1.

# LEDs on the MVME332XT

| NAME | LED COLOUR | FUNCTION                                                                                                      | REMARKS/ACTIONS                                        |
|------|------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| FAIL | Red        | Indicates the status of the fail bit in the control register (local) in case of an unrecoverable board error. | Reset the system.<br>Run processor bug or SSID test(s) |
| HALT | Red        | Indicates that the local processor enters a halted state or is being reset.                                   | Reset the system.<br>Run processor bug or SSID test(s) |
| RUN  | Green      | Indicates local bus activity.                                                                                 |                                                        |



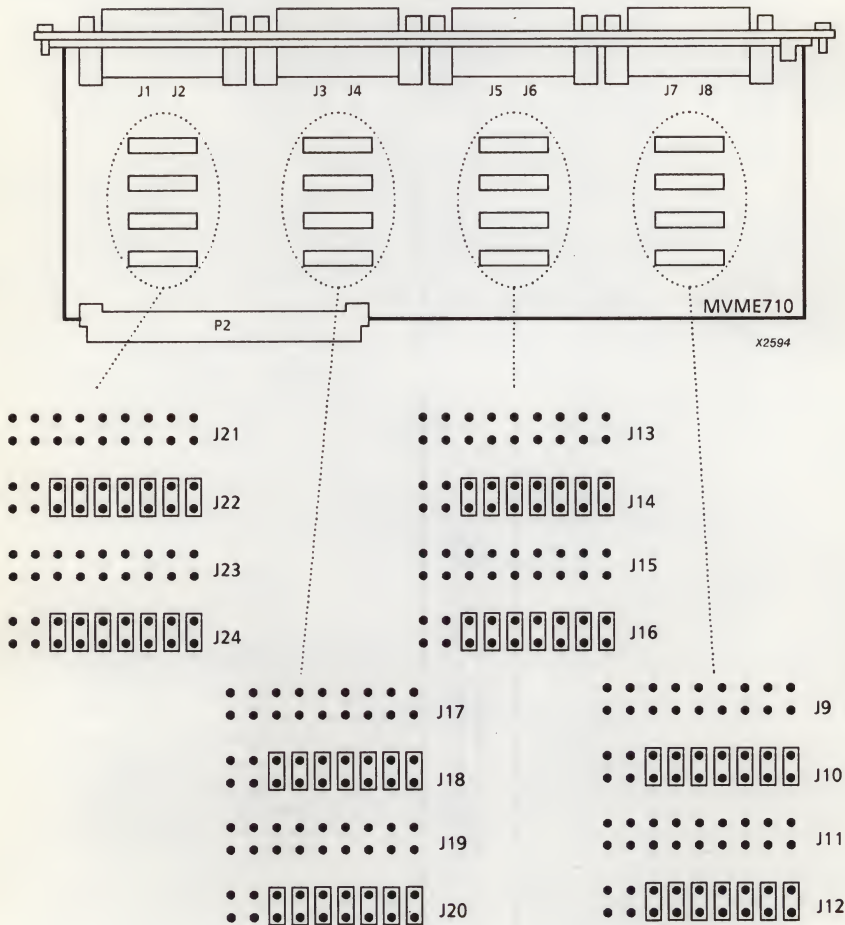
Centronics compatible  
parallel printer port.  
Cable to the MVME332PAX  
printer adapter.

NOTE: When an Epson printer is attached to the parallel port, one extra line feed is performed for each print action. This problem is solved by disconnecting pin 14 in the printer interface cable. See SI P9070-012.

Straps on the MVME332XT Transition Module (MVME710)

- Strapfield J9 and J10 belong to connector J7, channel SP7
- Strapfield J11 and J12 belong to connector J8, channel SP8
- Strapfield J13 and J14 belong to connector J5, channel SP5
- Strapfield J15 and J16 belong to connector J6, channel SP6
- Strapfield J17 and J18 belong to connector J3, channel SP3
- Strapfield J19 and J20 belong to connector J4, channel SP4
- Strapfield J21 and J22 belong to connector J1, channel SP1
- Strapfield J23 and J24 belong to connector J2, channel SP2

For setting of the channels see below.



#### 15.4.4 Installation

For the installation and positioning rules, see chapter 2.

After any change of the systems configuration concerning the serial I/O controllers, you must always run **/etc/portconfig -m** (in single user mode) to adapt the tty entries in the /dev directory.

The MVME710 transition module should be mounted in the rear of the cabinet, this transition module should be connected, via the delivered flat cable, to the P2 connector of the card slot used by the MVME332 board, see also section 15.3.2.

#### 15.4.5 Maintenance

The MVME332XT has a built-in self test, this test is started at power-up.

The MVME332XT can also be tested via the SSID tests and via the Terminal and Printer Diagnostics. When testing via SSID, loop back cables on the transition board must be used.





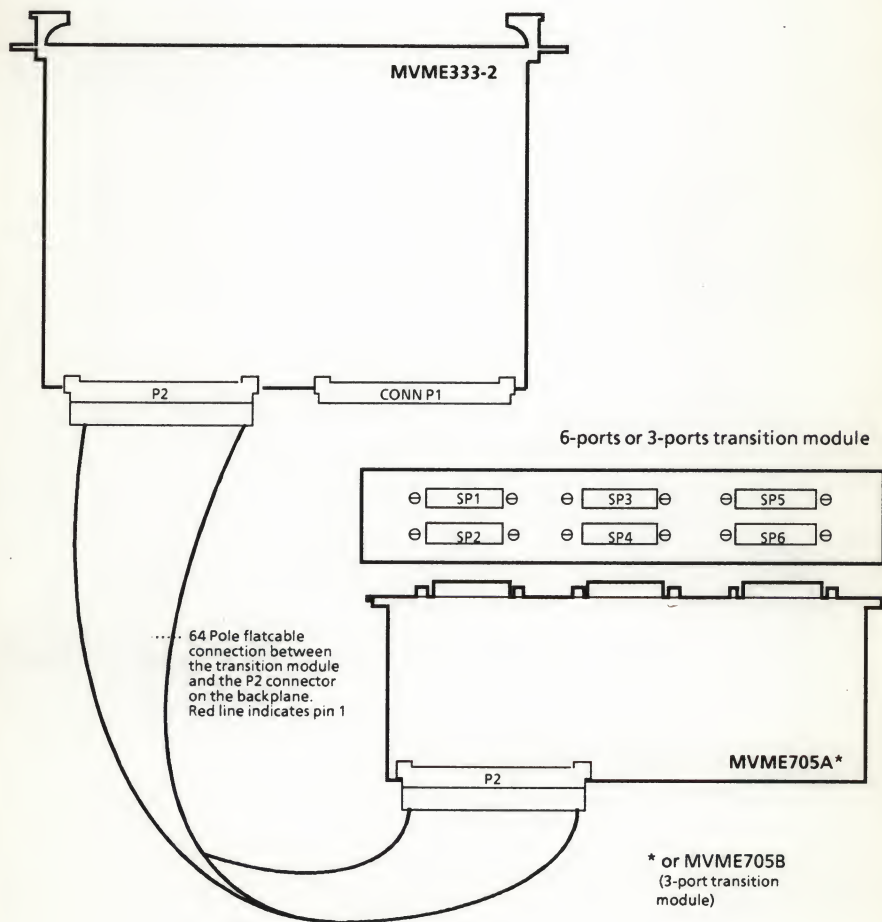
## 15.5 MVME333-2

The MVME333-2 is available as the so called MVME333-2 3-port controller and the MVME333-2 6-port controller. The difference between those two controllers is the transition module. The 3-port controller uses the MVME705B 3-ports transition module, the 6-port uses the MVME705A 6-ports transition module.

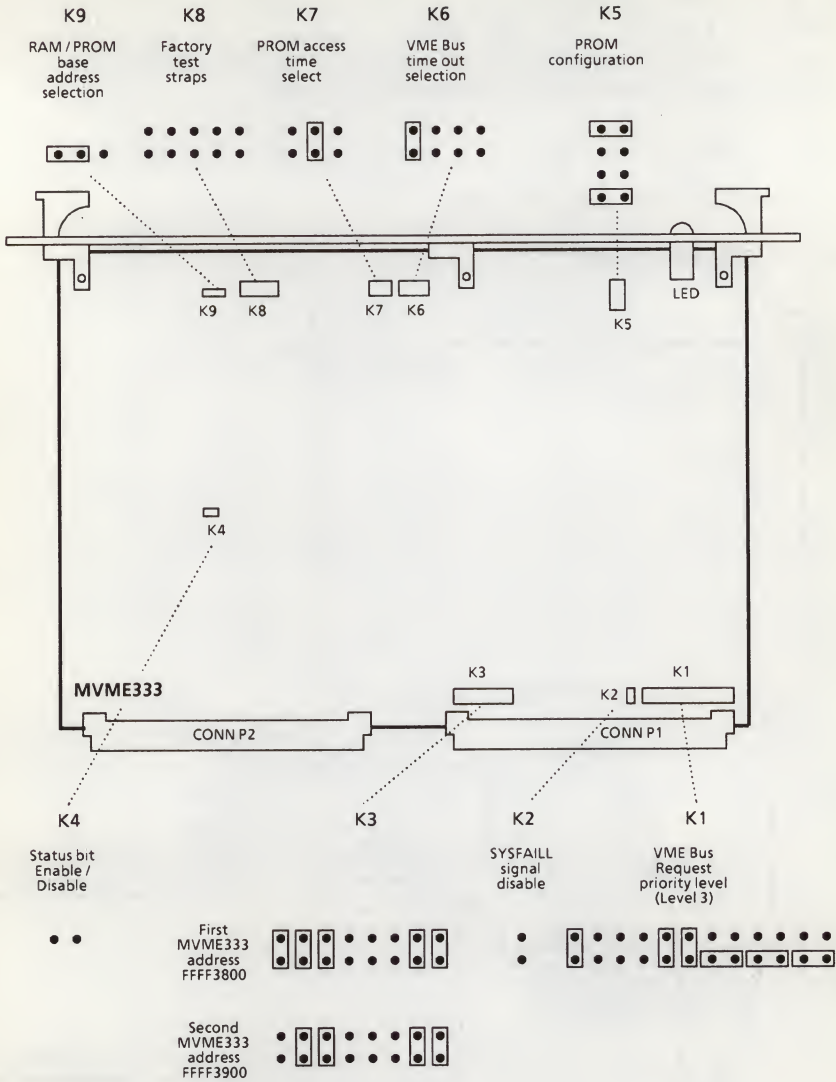
### 15.5.1 Characteristics

For the technical data, see section 15.1.

### 15.5.2 Connections



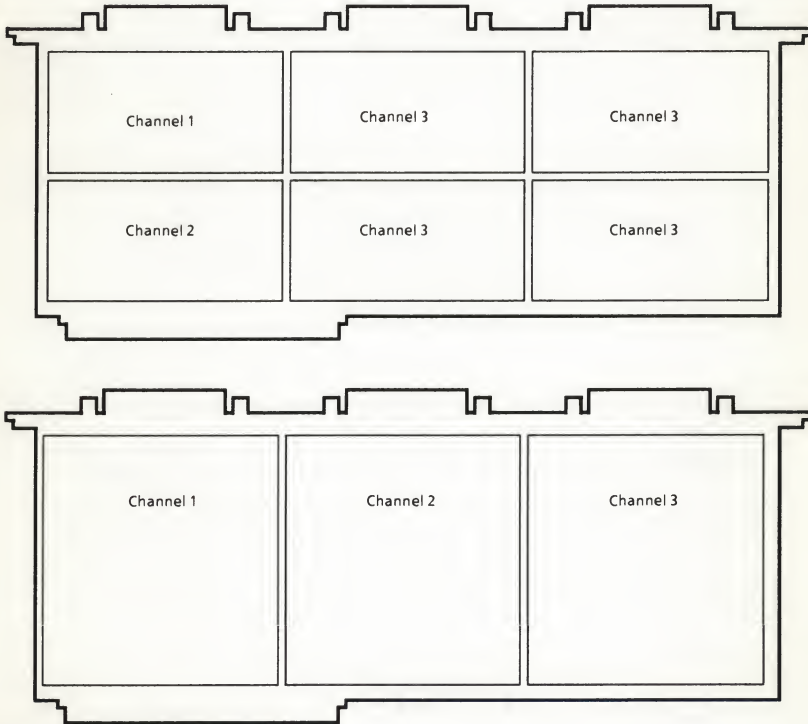
# 15.5.3 Strap Settings



## LEDs on the MVME333-2

| LED  | FUNCTION                                                                                                                    | ACTION                                                          |
|------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| FAIL | The LED is ON during the automatic board test and in case of a "FAIL" situation.<br>During normal operation the LED is OFF. | Test the board via the SSID programs.<br>If necessary, replace. |

## MVME705A/B Channel Positions



### MVME705A/B Configurations:

- RS232C DCE Configuration
- RS232C DTE Configuration
- RS422B Configuration

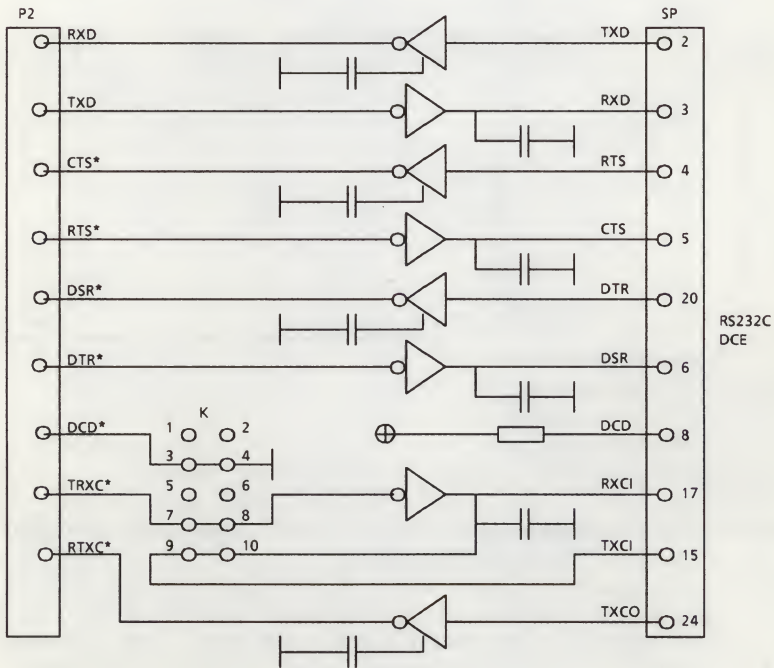
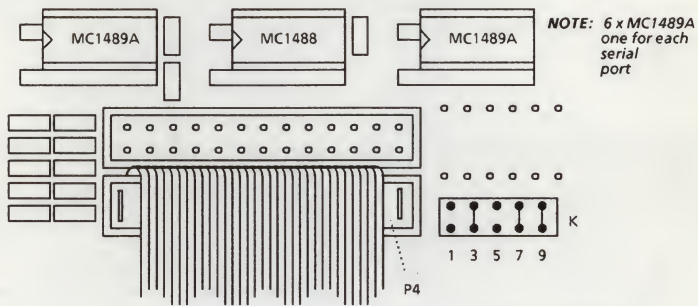
**NOTE 1:** The configuration strapping is for each channel the same, so only one channel is shown, on the next pages.

**NOTE 2:** Changing from RS232C DCE to RS232C DTE, and vice versa, can be done in the field. Changing to a RS422B from one of the RS232C interfaces can not be done in the field, this has to be done in the workshop, because components has to be soldered to or desoldered from the board.



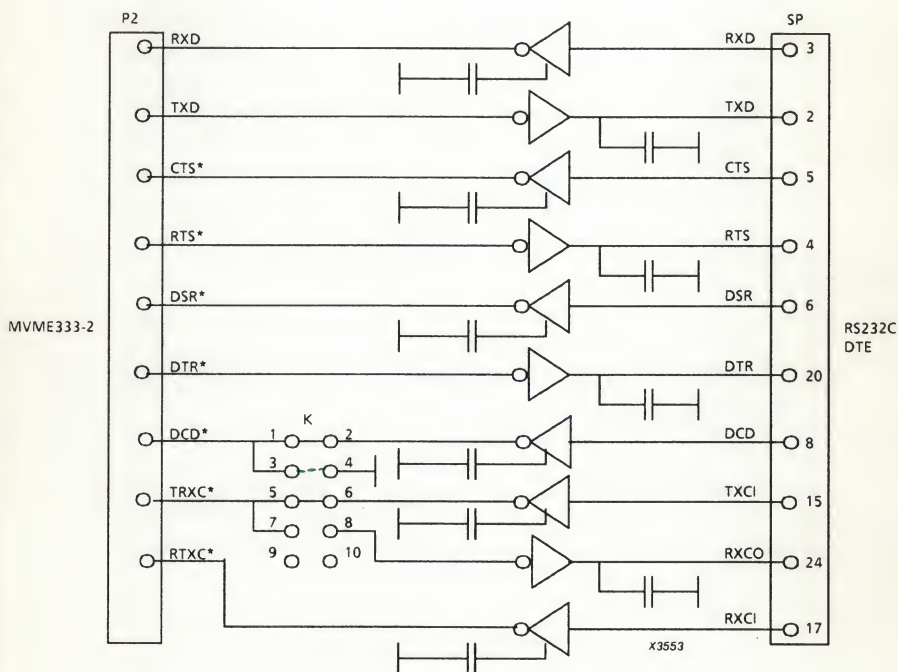
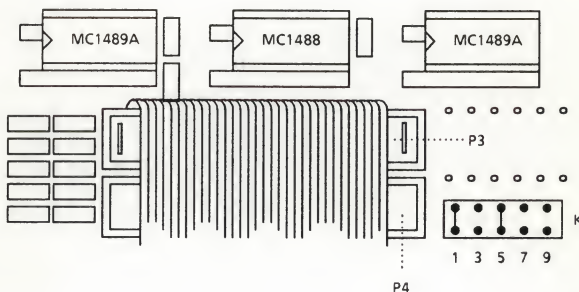
RS232C DCE Configuration

| STRAP   | FUNCTION                         | SETTING/REMARKS          |
|---------|----------------------------------|--------------------------|
| 1 to 2  |                                  | No strap, not used.      |
| 3 to 4  | Force DCD to ON for the MVME 333 | Strap must be installed. |
| 5 to 6  |                                  | No strap, not used.      |
| 7 to 8  | Connect TRXC* to RXCI            | Strap can be installed.  |
| 9 to 10 | Connect TRXC* not to TXCI        | Strap can be installed.  |



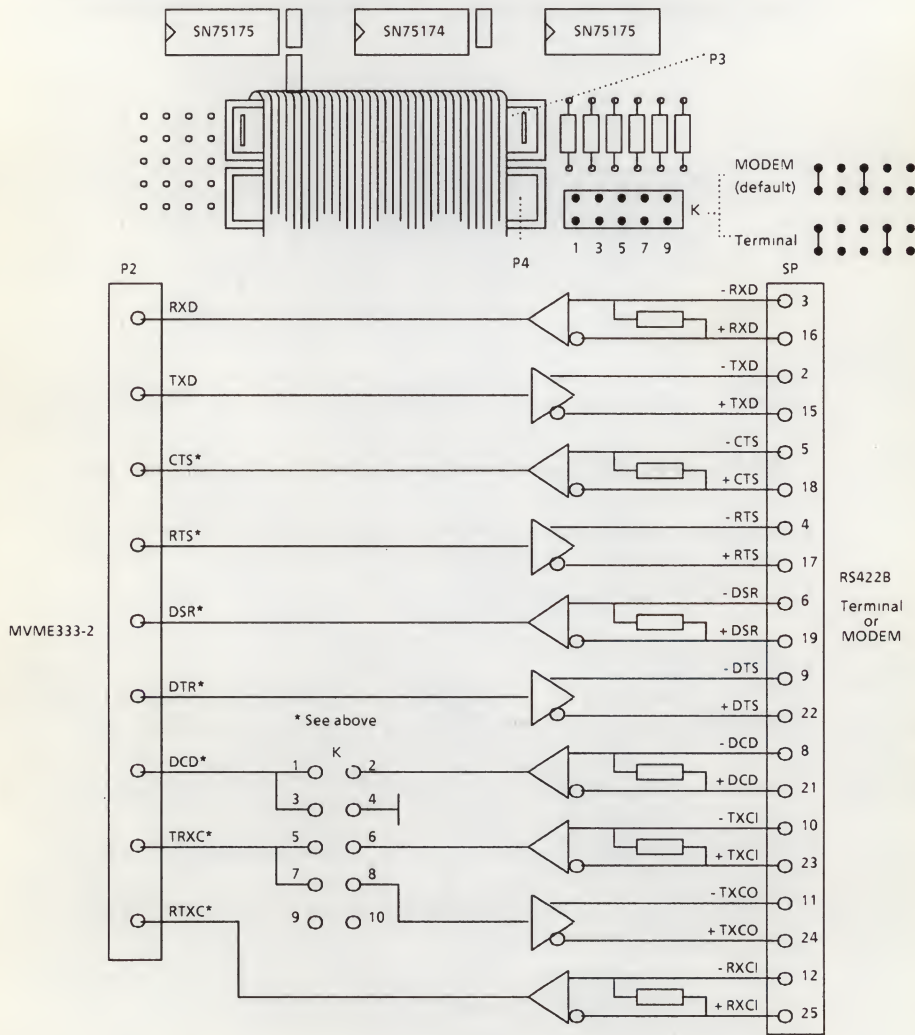
# RS232C DTE Configuration

| STRAP   | FUNCTION                           | SETTING/REMARKS                              |
|---------|------------------------------------|----------------------------------------------|
| 1 to 2  | Connect DCD* to DCD                | If strap installed, then no strap on 3 to 4. |
| 3 to 4  | Force DCD to ON for the MVME 333-2 | If strap installed, then no strap on 1 to 2. |
| 5 to 6  | Connect TRCI to TRXC*              | Strap installed.                             |
| 7 to 8  | Connect TRXC* to TXCO              | Not used, no strap.                          |
| 9 to 10 |                                    | No strap.                                    |

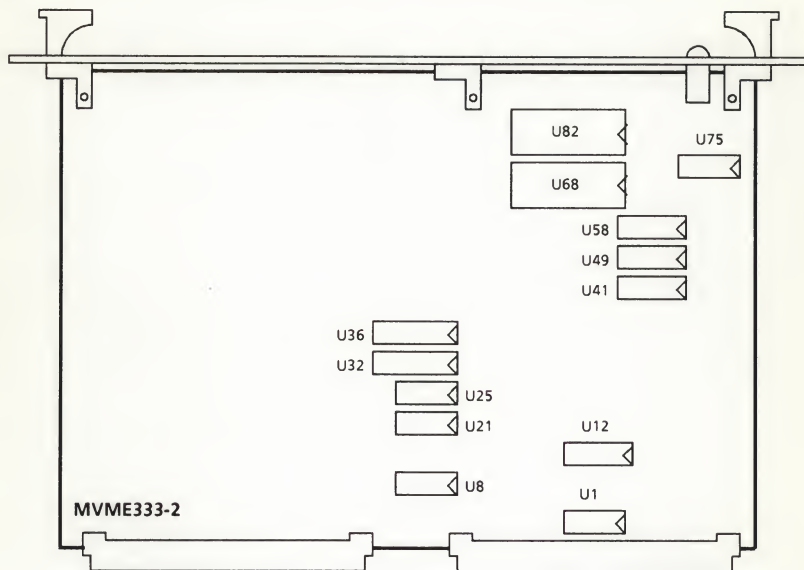


RS422B Configuration (RS422B supports a DTE configuration only)

| STRAP   | FUNCTION                               | SETTING/REMARKS                              |
|---------|----------------------------------------|----------------------------------------------|
| 1 to 2  | Connect DCD* to +DCD -DCD (default)    | If strap installed, then no strap on 3 to 4. |
| 3 to 4  | Force DCD to ON for the MVME 333-2     | If strap installed, then no strap on 1 to 2. |
| 5 to 6  | Connect TRXC* to +TXCI -TXCI (default) | Strap can be installed, no strap on 7 to 8.  |
| 7 to 8  | Connect TRXC* to +TXCO -TXCO           | Strap can be installed, no strap on 5 to 6.  |
| 9 to 10 |                                        | No strap.                                    |



## Firmware on the MVME333-2



**NOTE:** *MVME-2 01-W3503B05*

*PROM 333-2 F/W Rel. 1.1 odd*

*PROM 333-2 F/W Rel. 1.1 even*

Motorola code :

*B*

*(U82)*

*A*

*(U68)*

Commercial nr. :

*8122-189-12491*

*8122-189-12501*

### 15.5.4 Installation

For the installation and positionings rules, see chapter 2.

When installing the MVME333-2 the software to the board must be installed onto the system, for the procedure how to do this, see the Software Release Guide.

#### Removal

When the board has to be removed from the system it may be necessary to remove the software belonging to the board also from the system, see for this the Software Release Guide.

### 15.5.5 Maintenance

The MVME333 has a built-in self test, this test is started at power-up.  
The MVME333-2 can also be tested via the SSID.



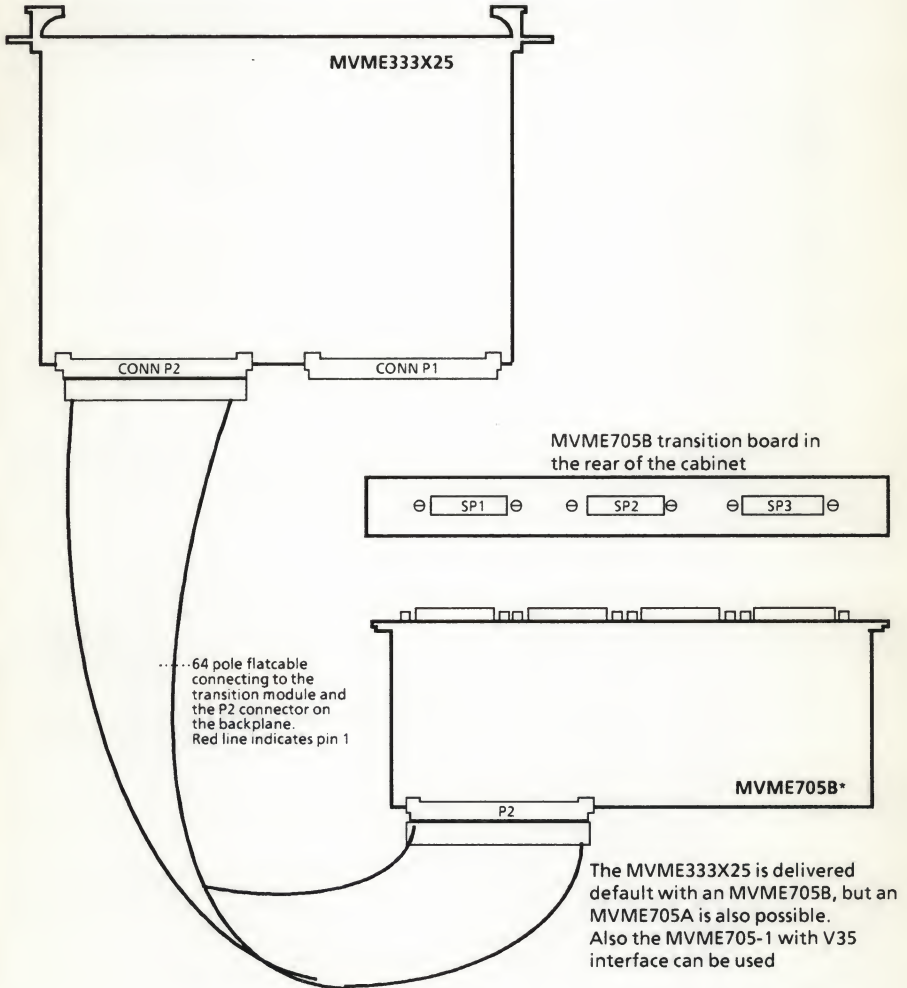


## 15.6 MVME333X25

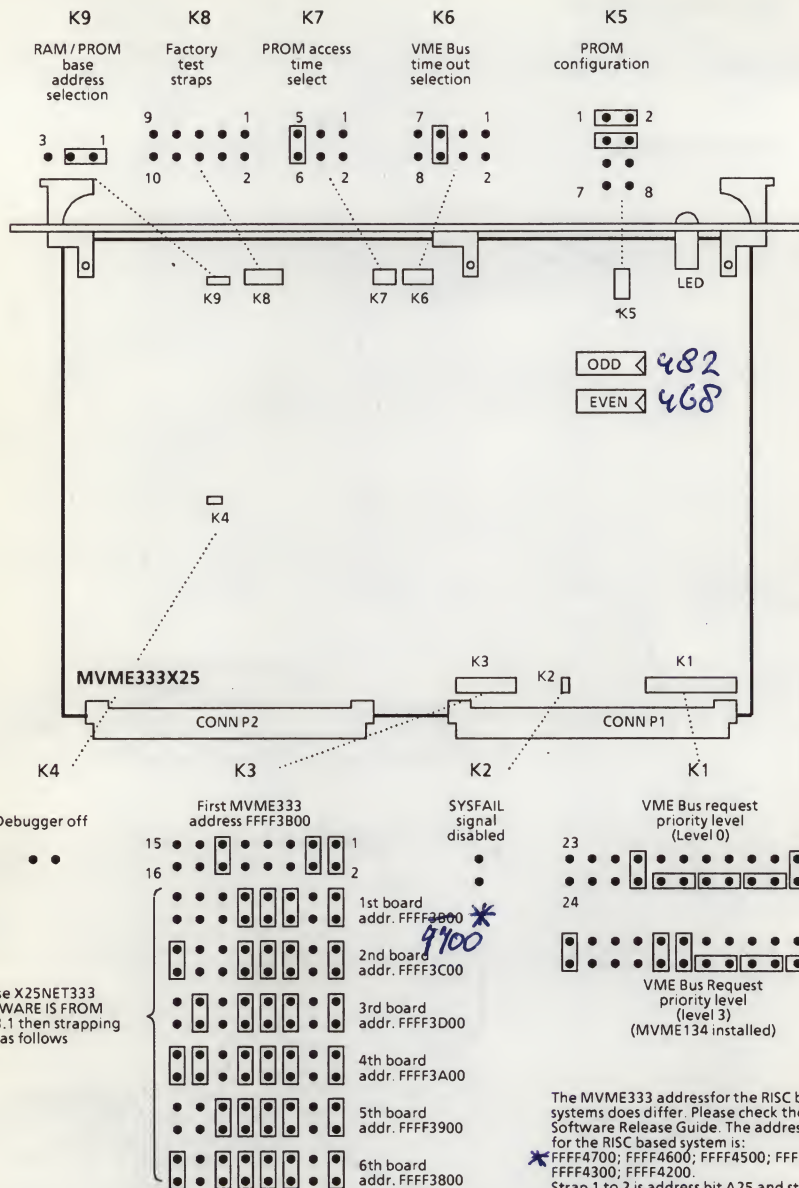
### 15.6.1 Characteristics

For the technical data, see section 15.1.

### 15.6.2 Connections



## 15.6.3 Strap Settings

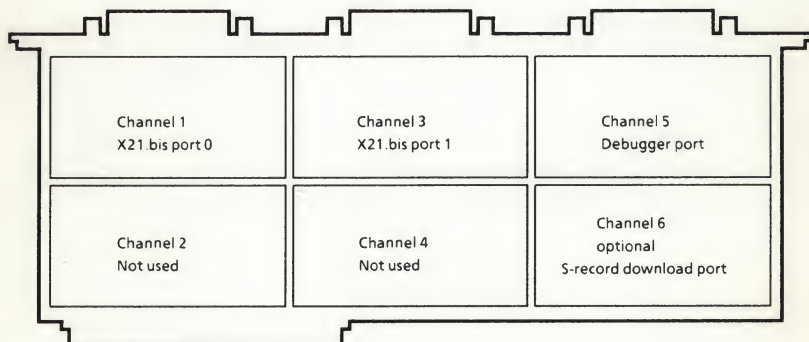


\* NOTE: Software release can be found on the X25NET333 distribution tape

## LEDs on the MVME333X25

| LED  | FUNCTION                                                                                                                    | ACTION                                             |
|------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| FAIL | The LED is ON during the automatic board test and in case of a "FAIL" situation.<br>During normal operation the LED is OFF. | Test via SSID.<br>If necessary, replace the board. |

## MVME705A Channel Positions



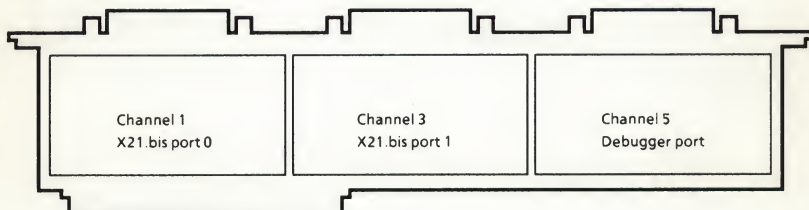
## MVME705A/B Configurations:

- X21.bis (RS232C) DCE Configuration
- X21.bis (RS232C) DTE Configuration

## MVME705-1 Configurations:

- X21.bis (RS232C) & V.35 DCE Configuration
- X21.bis (RS232C) & V.35 DTE Configuration

## MVME705B/MVME705-1 Channel Positions

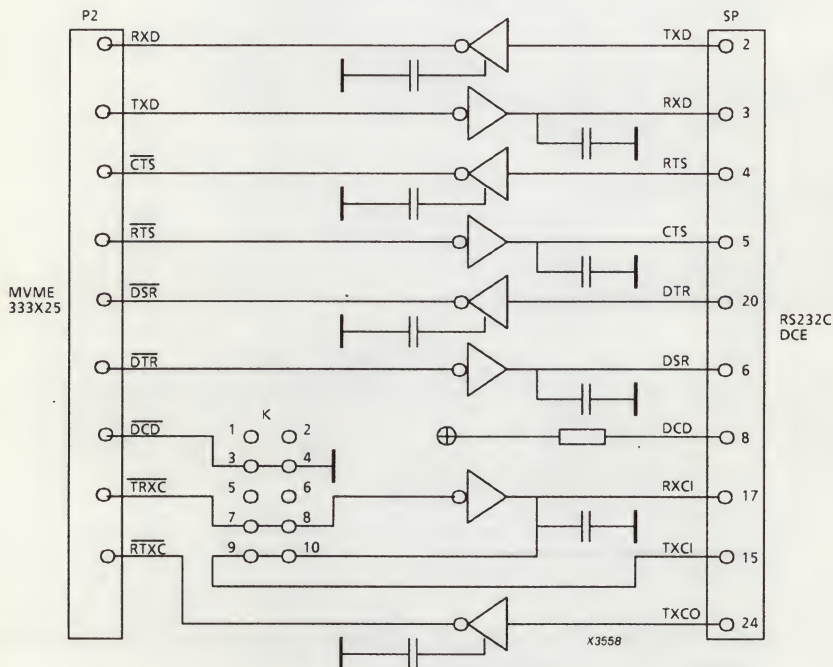
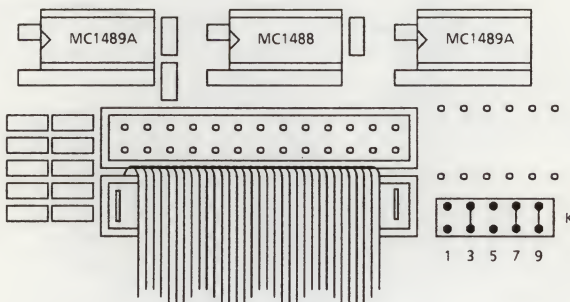


**NOTE 1:** The configuration strapping is for each channel the same, so only one channel is shown, on the next pages.

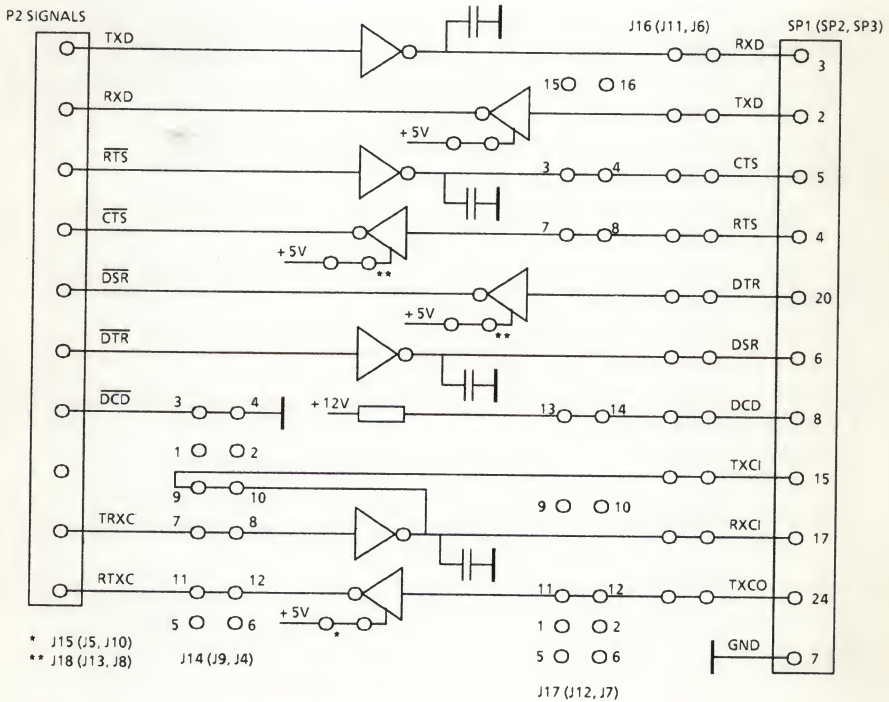
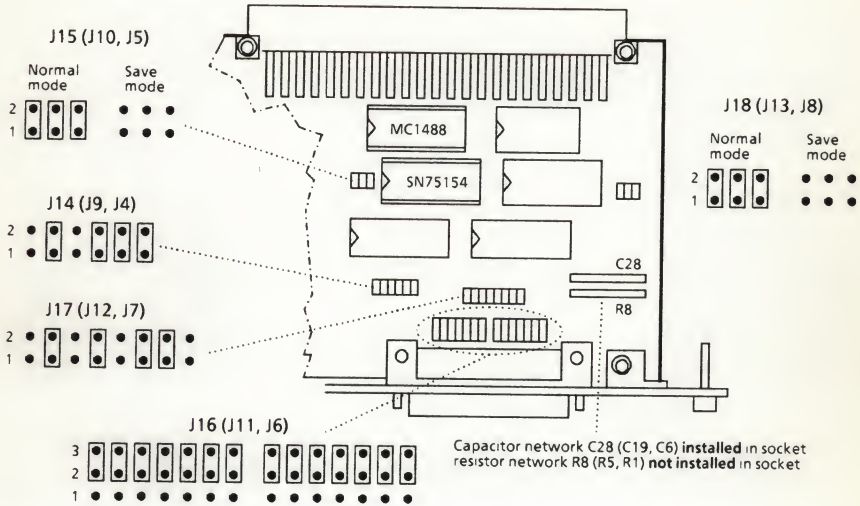


# X21.bis (RS232C) DCE Configuration (MVME705A/B)

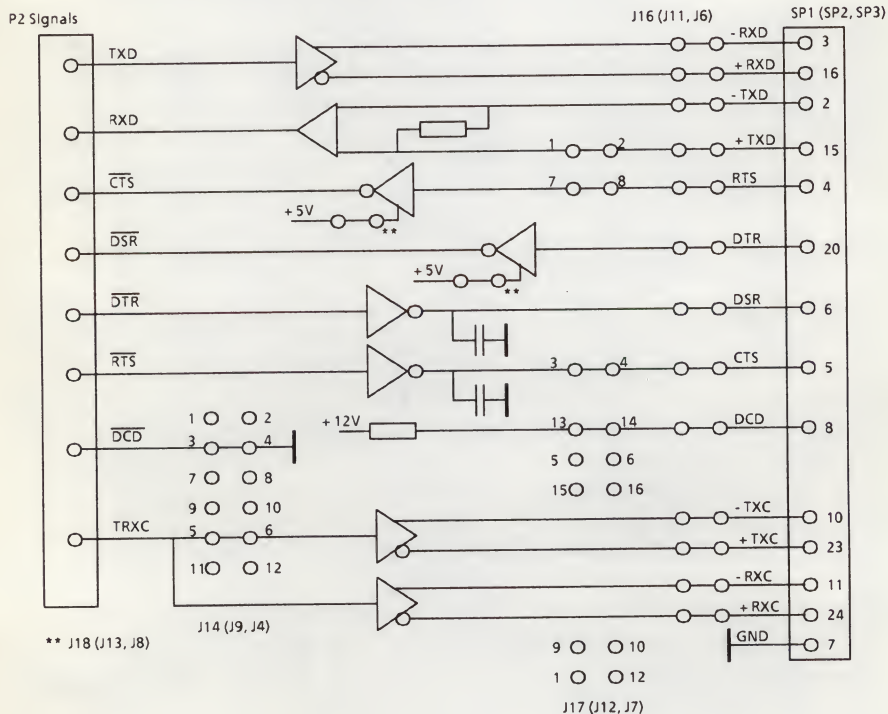
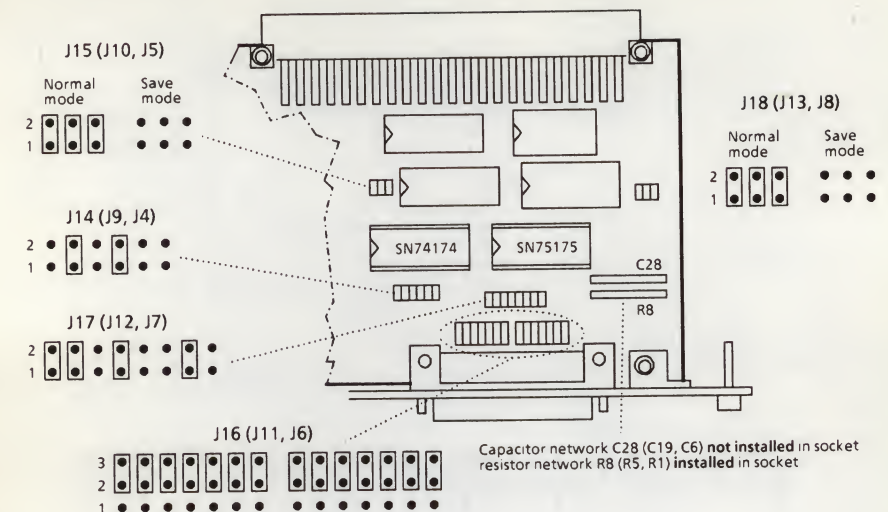
| STRAP   | FUNCTION                         | SETTING/REMARKS          |
|---------|----------------------------------|--------------------------|
| 1 to 2  |                                  | No strap, not used.      |
| 3 to 4  | Force DCD to ON for the MVME 333 | Strap must be installed. |
| 5 to 6  |                                  | No strap, not used.      |
| 7 to 8  | Connect TRXC* to RXCI            | Strap must be installed. |
| 9 to 10 | Connect TRXC*not to TXCI         | Strap must be installed. |



### X21.bis (RS232C) DCE Configuration (MVME705-1)

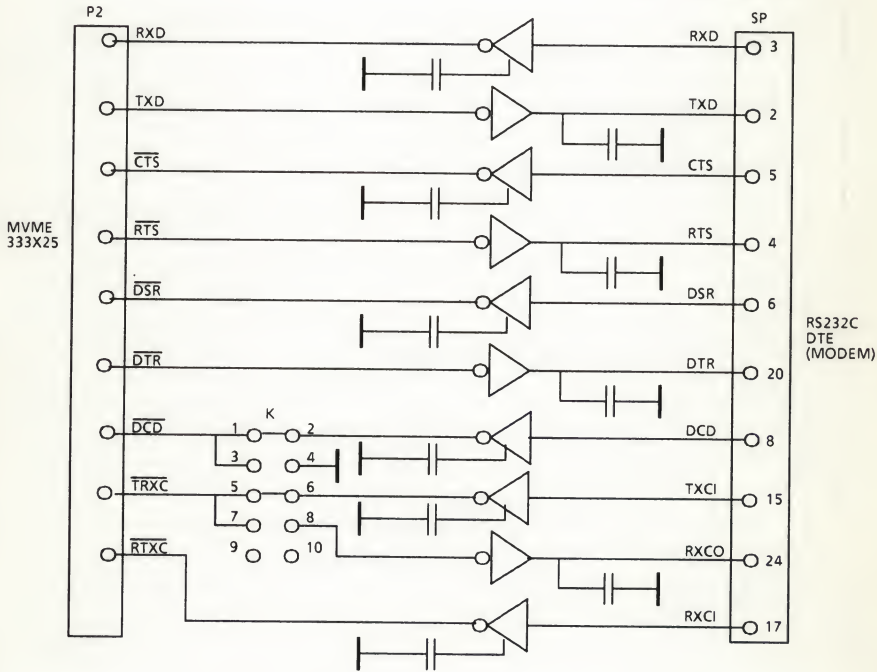
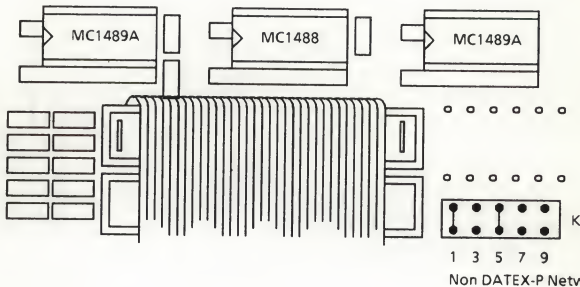


# V.35 DCE Configuration (MVME705-1)



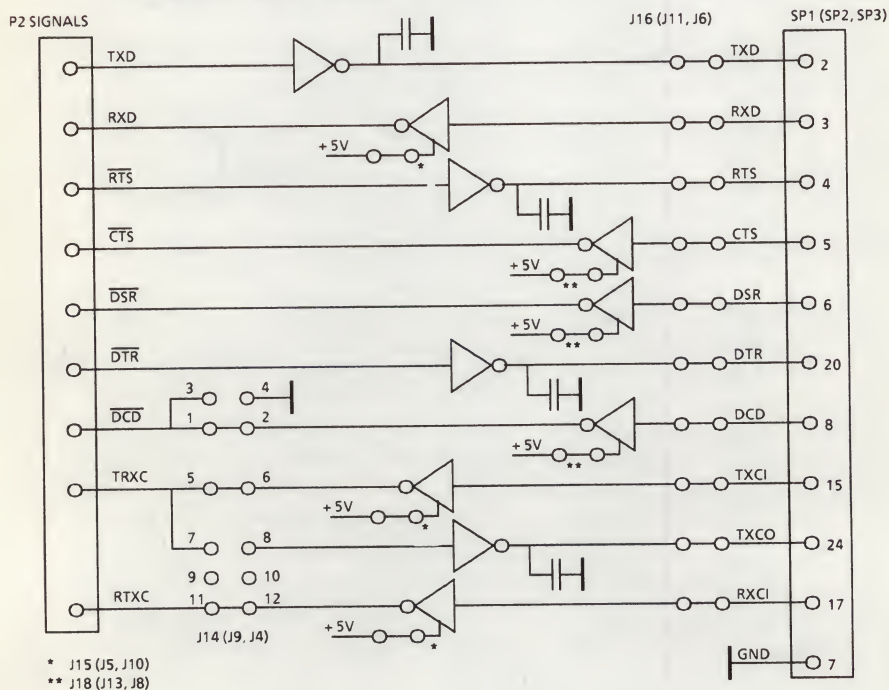
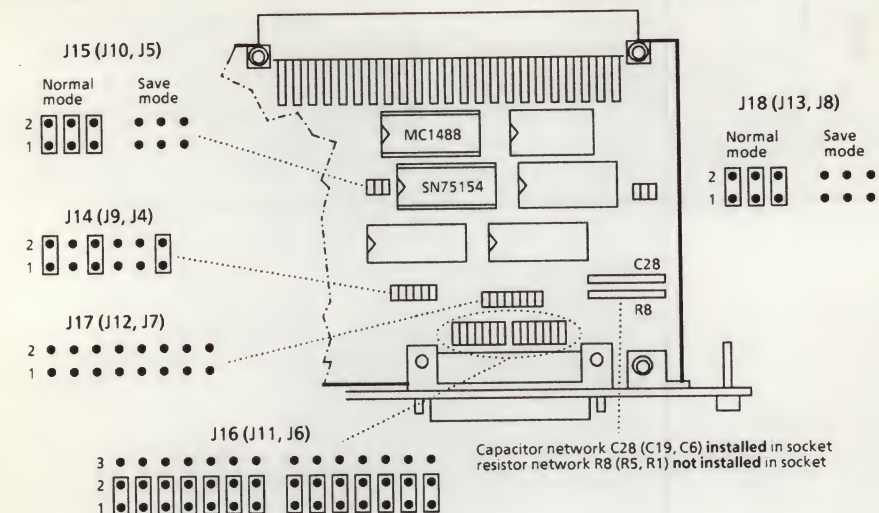
X21.bis (RS232C) DTE Configuration **NON DATEX-P** networks (MVME705A/B)

| STRAP   | FUNCTION                         | SETTING/REMARKS     |
|---------|----------------------------------|---------------------|
| 1 to 2  | Connect DCD* to DCD              | Strap installed     |
| 3 to 4  | Force DCD to ON for the MVME 333 | No strap installed  |
| 5 to 6  | Connect TRCI to TRXC*            | Strap installed.    |
| 7 to 8  | Connect TRXC* to RXCO            | Not used, no strap. |
| 9 to 10 |                                  | No strap.           |

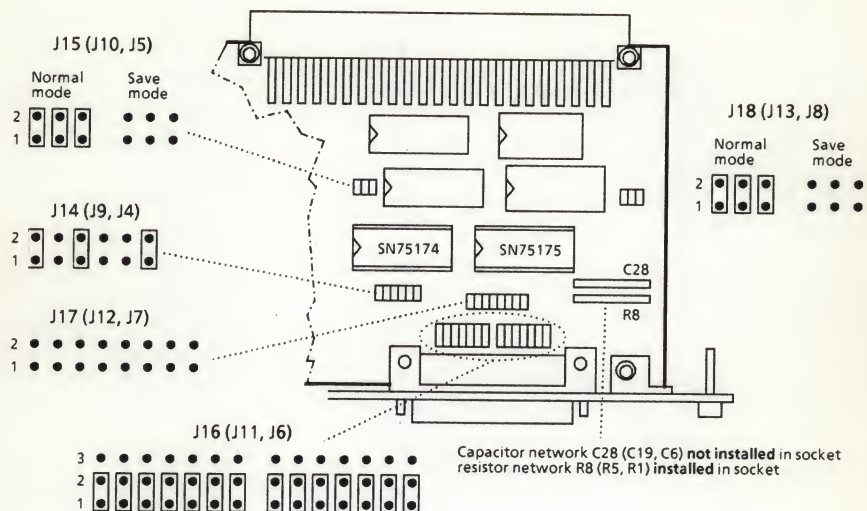




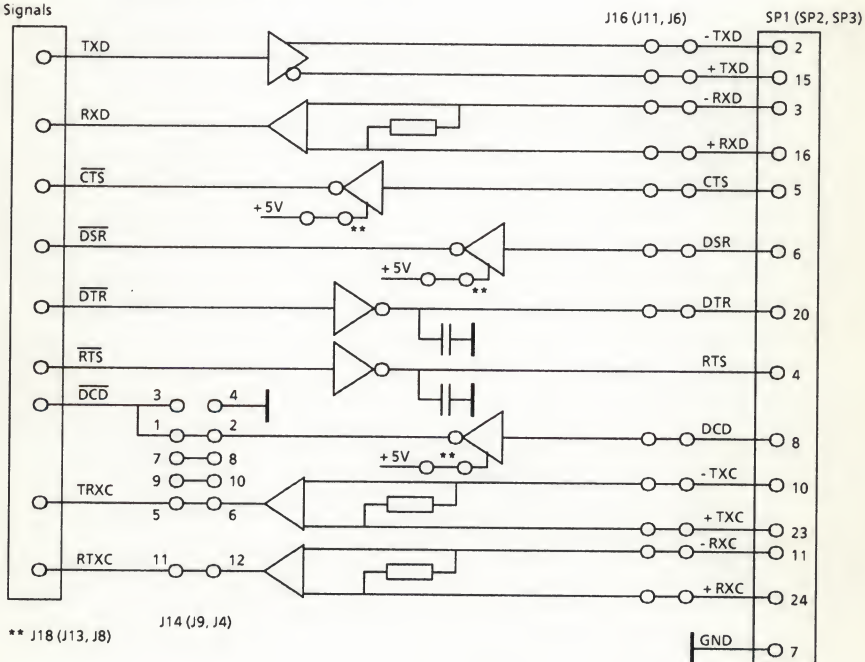
# X21.bis (RS232C) DTE Configuration **NON DATEX-P** networks (MVME705-1)



# V.35 DTE Configuration **NON DATEX-P** networks (MVME705-1)

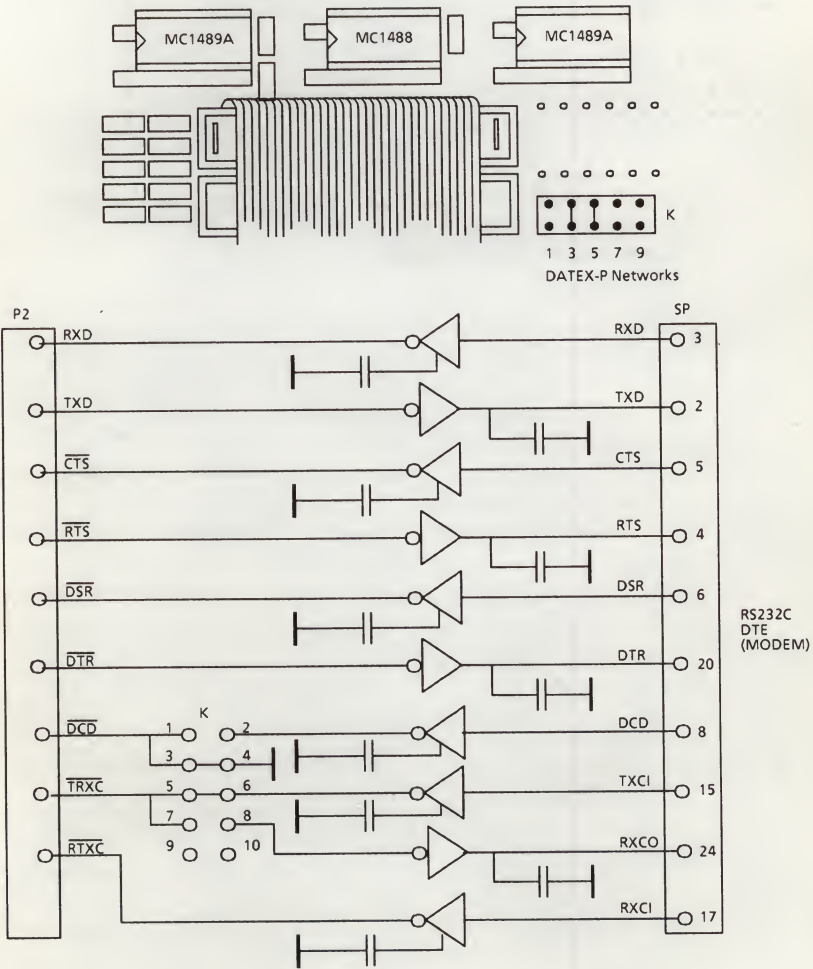


P2 Signals



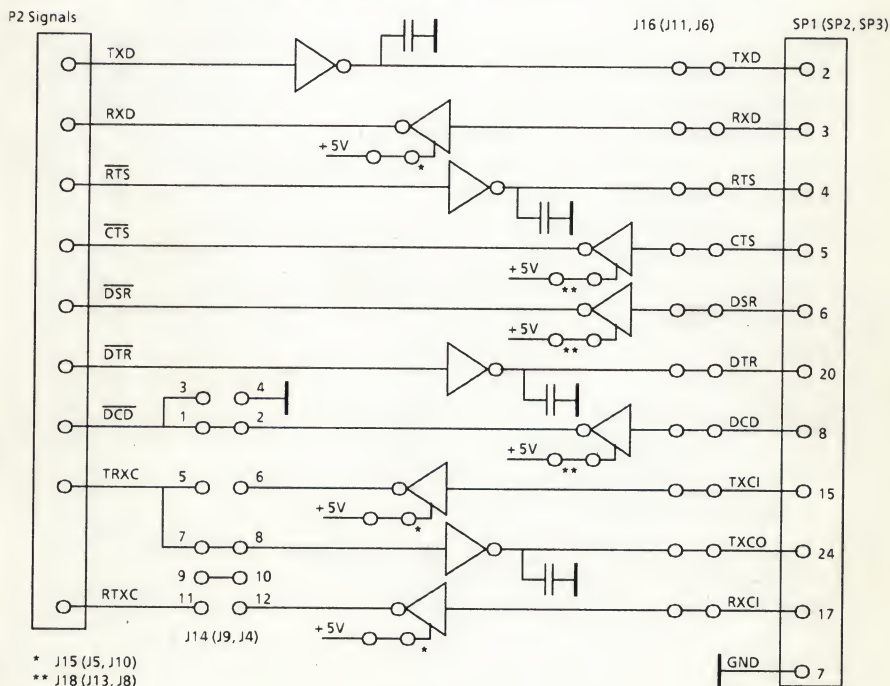
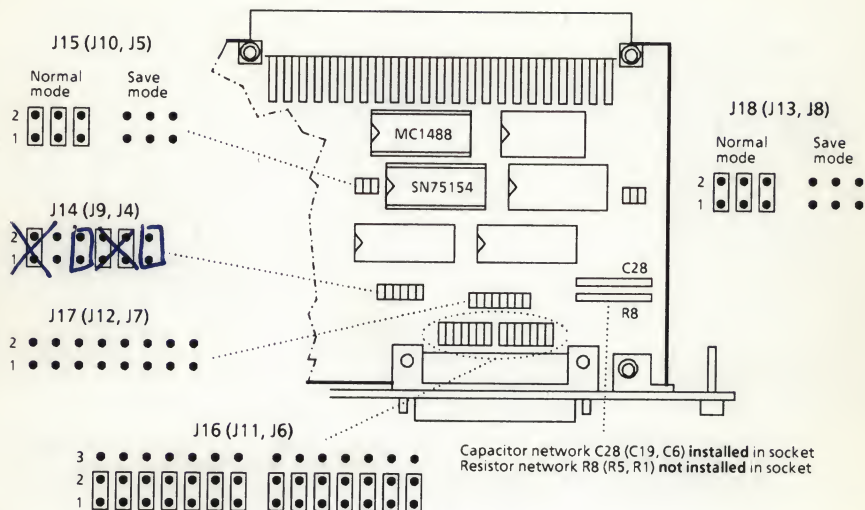
X21.bis (RS232C) DTE Configuration **DATEX-P** networks (MVME705A/B)

| STRAP   | FUNCTION                            | SETTING/REMARKS     |
|---------|-------------------------------------|---------------------|
| 1* to 2 | Connect DCD* to DCD                 | No strap installed  |
| 3 to 4  | Force DCD to ON for the MVME 333X25 | Strap installed     |
| 5 to 6  | Connect TRCI to TRXC*               | Strap installed.    |
| 7 to 8  | Connect TRXC* to RXCO               | Not used, no strap. |
| 9 to 10 |                                     | No strap.           |



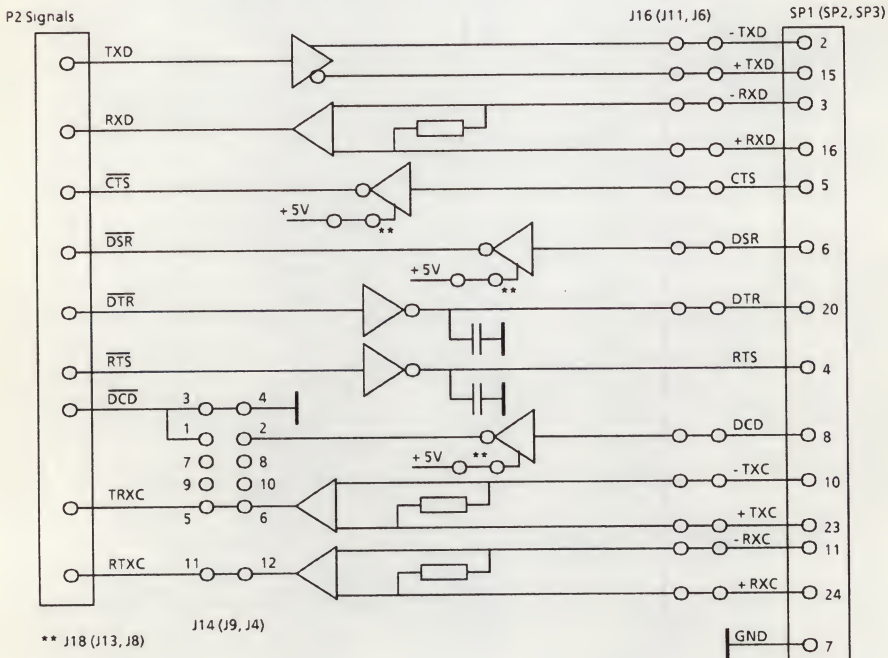
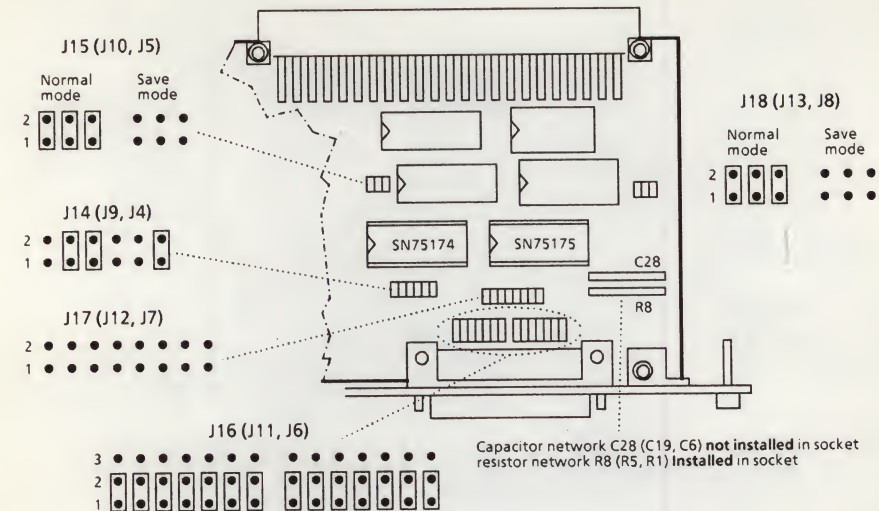
*hil blz 35 van het packet switching systeem  
DN1*

# X21.bis (RS232C) DTE Configuration **DATEX-P** networks (MVME705-1)

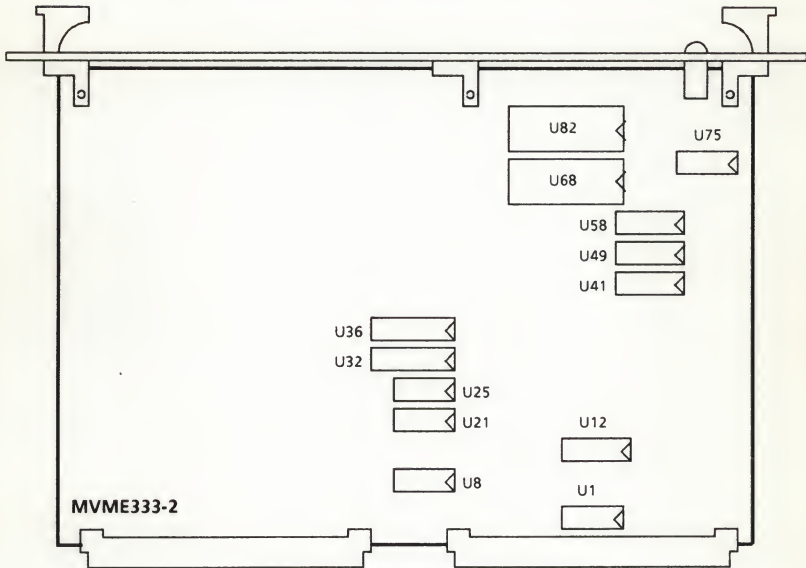




### V.35 DTE Configuration **DATEX-P** networks (MVME705-1)



## Firmware on the MVME333X25



**NOTE:** *MVME333X25 = MVME333-2 + X25 firmware PROMS (U68 & U82)*

*PROM 333-2 F/W Rel. 1.1. odd (U82) 8122-189-12491*

*PROM 333-2 F/W Rel. 1.1. even (U68) 8122-189-12501*

*X.25 F/W Rev. 2.0 odd (U82) 8122-189-12042*

*X.25 F/W Rev. 2.0 even (U68) 8122-189-12032*

### 15.6.4 Installation

For the installation and positioning rules, see chapter 2.

When installing the MVME333X25 the software belonging to this board must be installed onto the system, to do this **use** the Software release Guide which belongs to this product.

#### Removal

When the board has to be removed from the system, it may be necessary to remove the software, belonging to this board, from the system, see for this the Software Release Guide.

### 15.6.5 Maintenance

The MVME333X25 has a built-in self test, this test is started at power up.

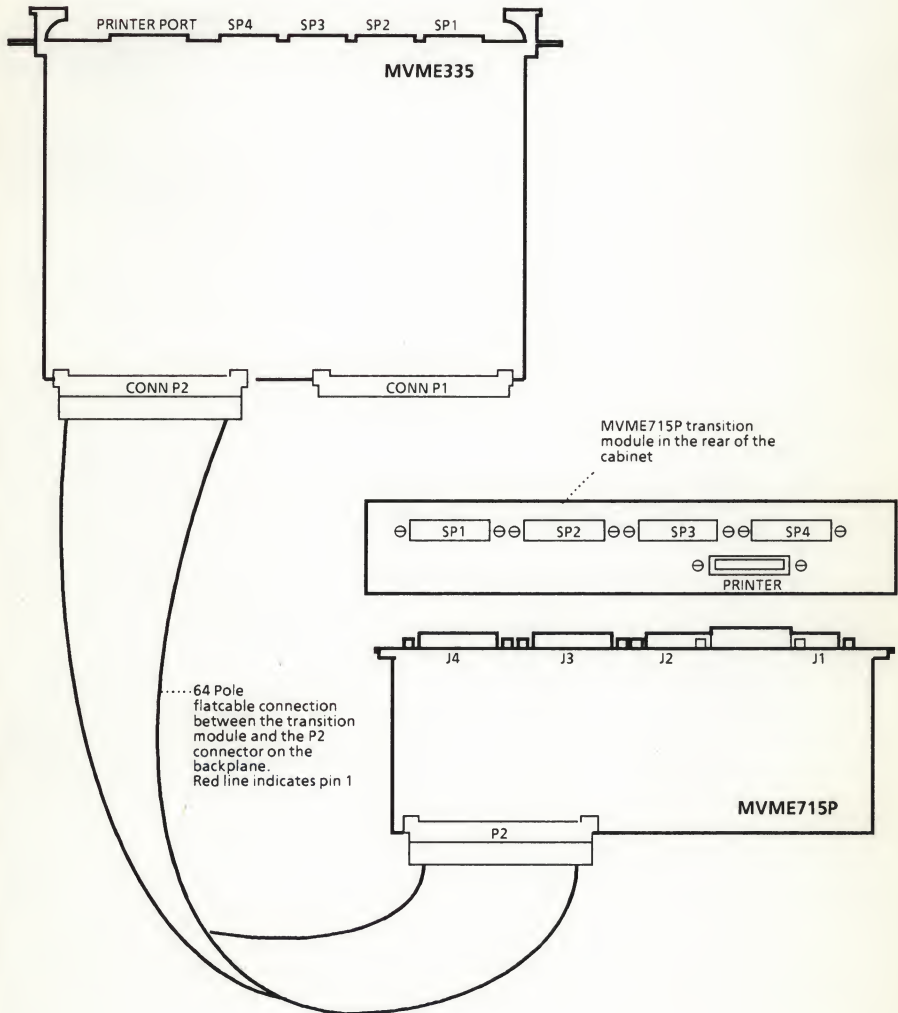
The MVME333X25 can also be tested via SSID. When testing the MVME333X25 we must use loop back cables on the transition boards. When using loop back cables also the MVME705A is tested.

## 15.7 MVME335

### 15.7.1 Characteristics

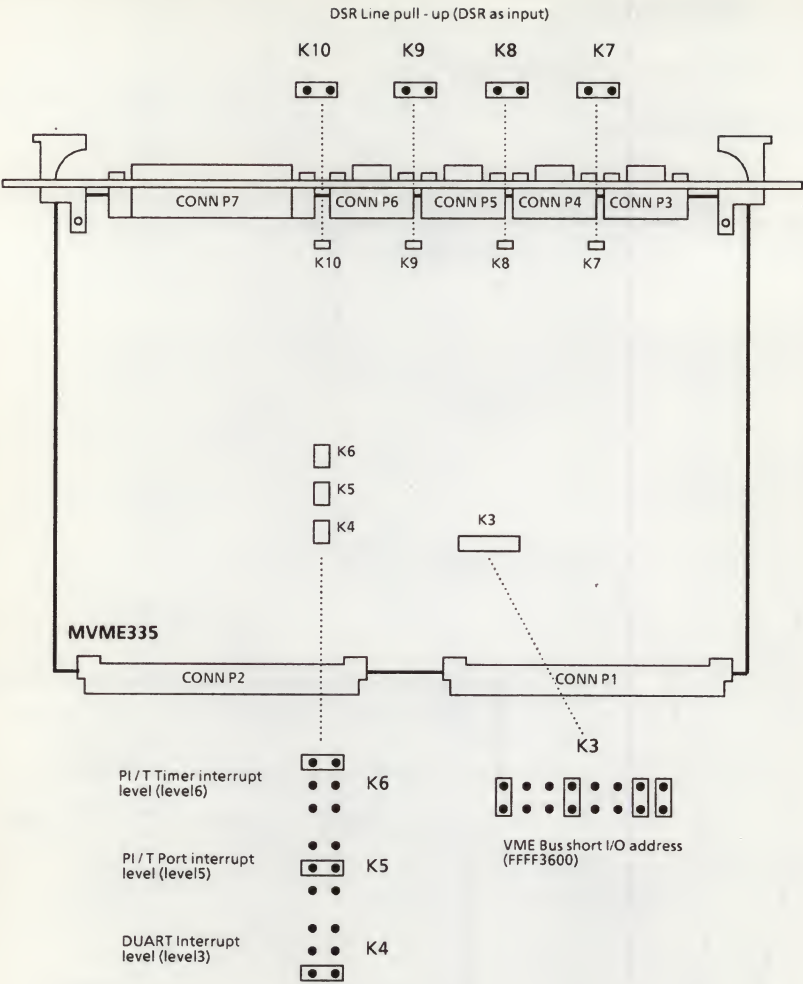
For the technical data, see section 15.1.

### 15.7.2 Connections

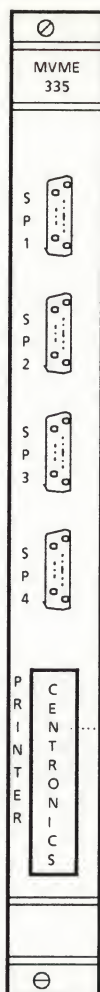




15.7.3 Strap Settings



The MVME335 has no LED's on the front panel.



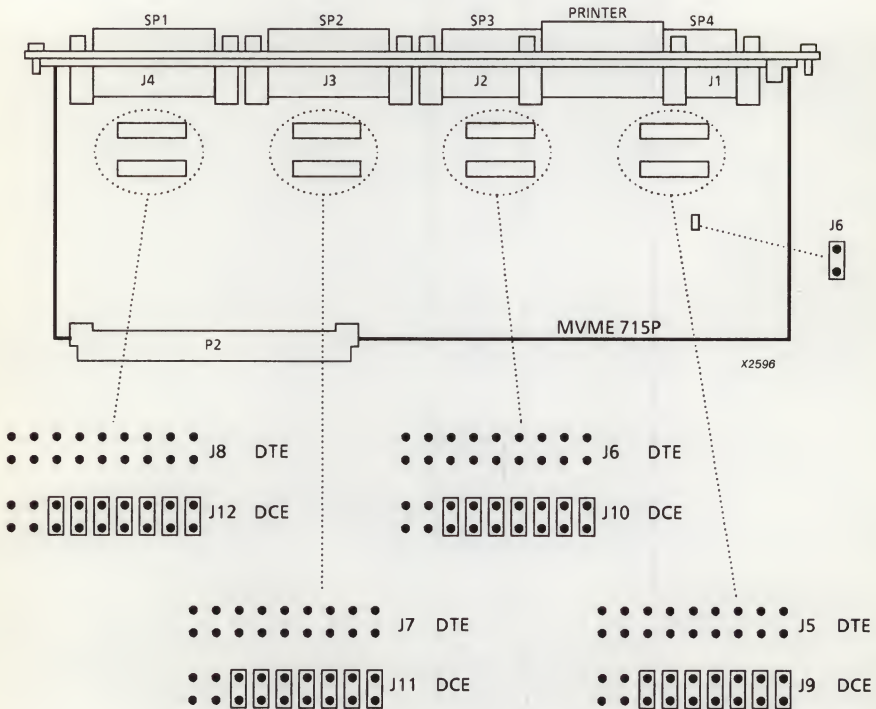
Centronix compatible parallel printer port.

NOTE: When an Epson printer is attached to the parallel port, one extra line feed is performed for each print action. This problem is solved by disconnecting pin 14 in the printerinterface cable. See SI P9070-012.

# Straps on the MVME335 transition board (MVME715P)

Strapfield J5 and J9 belong to connector J1, channel SP4  
 Strapfield J6 and J10 belong to connector J2, channel SP3  
 Strapfield J7 and J11 belong to connector J3, channel SP2  
 Strapfield J8 and J12 belong to connector J4, channel SP1

For setting of the channels, see below.



#### 15.7.4 Installation

For the installation and positioning rules, see chapter 2.

After any change of the system configuration concerning the serial I/O controllers, you must always run **/etc/portconfig -m** (in single user mode) to adapt the tty entries in the /dev/directory.

The MVME715P transition module should be mounted in the rear of the cabinet, this transition module should be connected, via the delivered 50 pole flat cable, to the P2 connector of the card slot used by the MVME335 board, see also section 15.7.2.

#### 15.7.5 Maintenance

The MVME335 has no built-in self test but can be tested using the SSID tests. When testing the MVME335 we must use loop back cables on the Transition board.



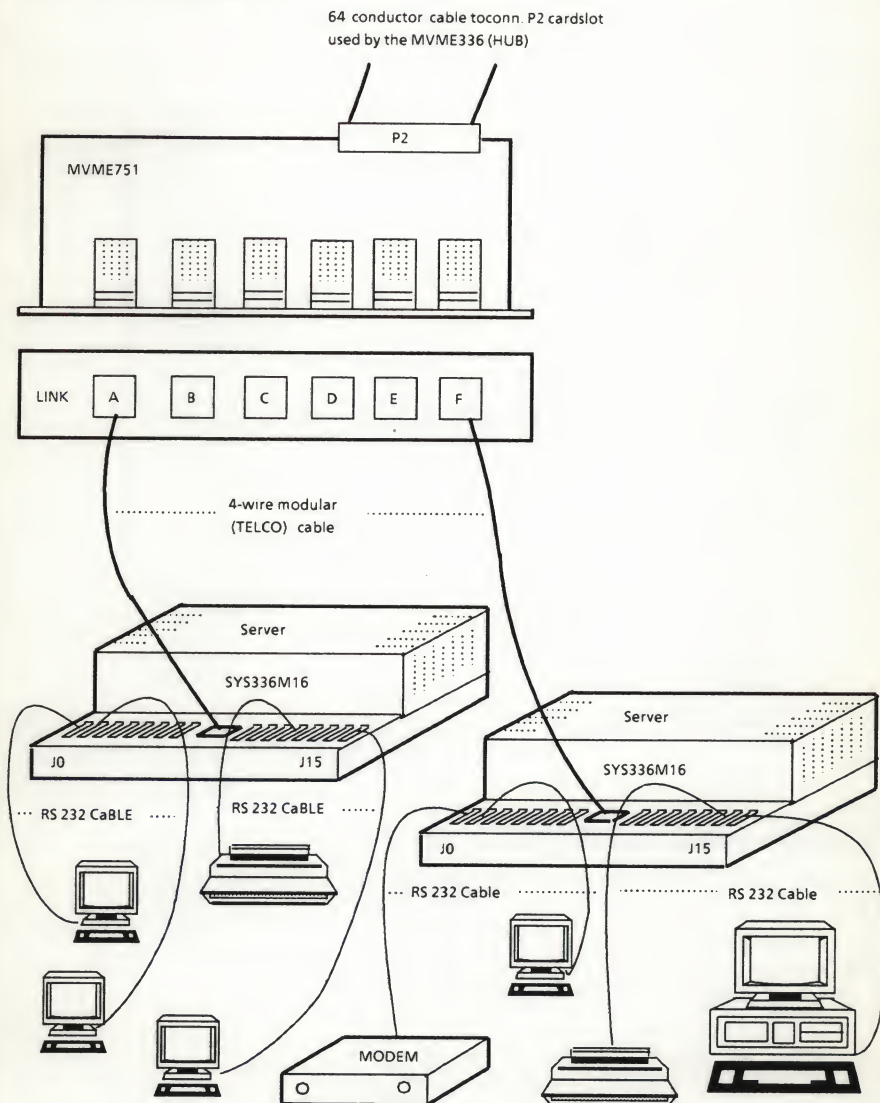


## 15.8 MVME336

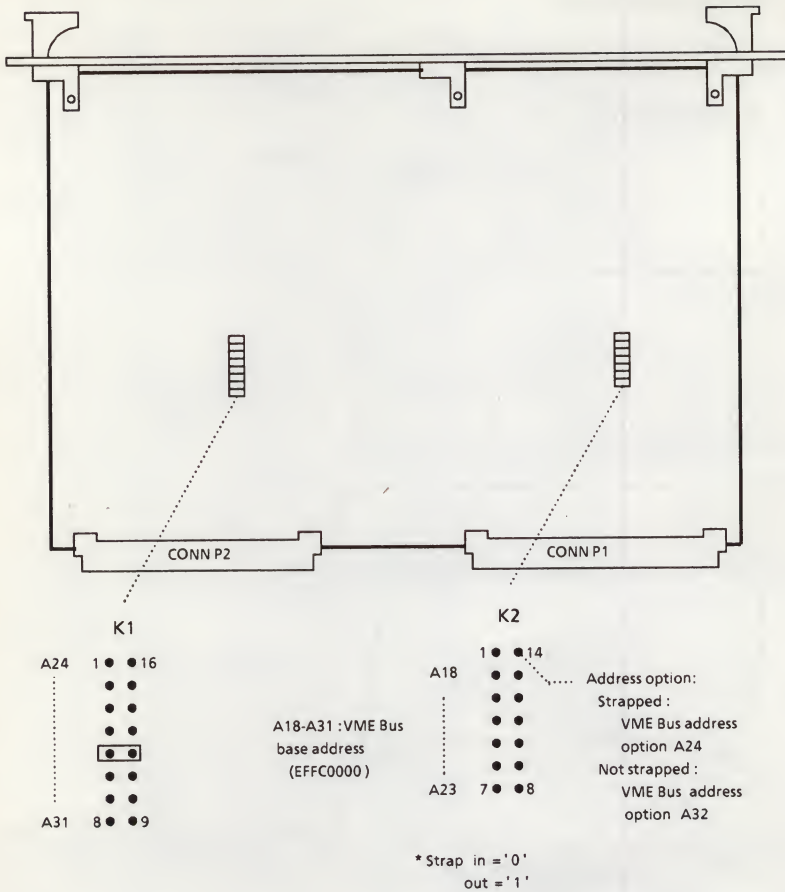
### 15.8.1 Characteristics

For the technical data, see section 15.1.

### 15.8.2 Connections



### 15.8.3 Strap Settings

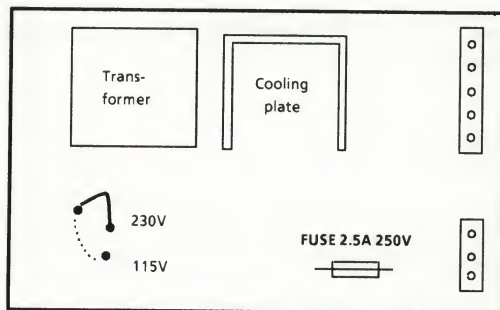
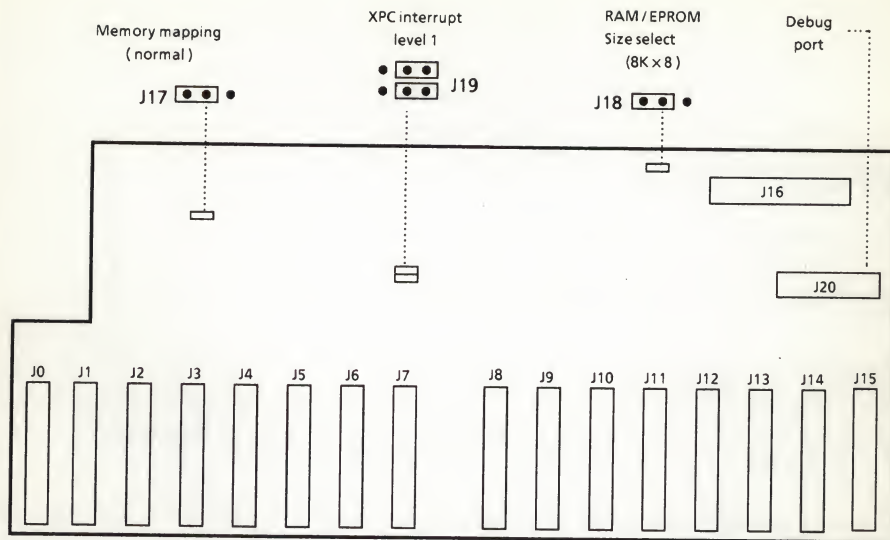


Straps on the MVME336 transition board (MVME751)

There are no straps on the MVME751 transition board!!.

Straps on the SYS336M16 Server:

- Main PCB
- Power Supply Board (Situating above the main PCB)



## LED indicators SYS336M16

### RUN indicator

After applying power the green LED on the connection panel should glow steadily.

### Firmware Operation Indicator

The yellow LED is used by the Server firmware to indicate what it is doing.

#### Self test

LED is on (steady glow)

#### Internal error

Slow, regular flash with a periodic pattern.

Count the number of flashes until a long pause occurs to determine the error code:



- 2 = EPROM test failed
- 3 = MPU local RAM test failed
- 4 = MPU and XPC global RAM test failed
- 5 = Addressing test failed
- 6 = XPC test failed
- 7 = MFP test failed

|                          |                     |
|--------------------------|---------------------|
| Waiting for link startup | Fast, regular flash |
| Link connected           | Off                 |
| Noisy line               | Random flickering   |

#### 15.8.4 Installation

Once the address options have been set, the module is ready for installation. For the installation and positioning rules, see chapter 2.

After any change of the system configuration concerning the serial I/O controllers, you must always run `/etc/portconfig -m` (in single user mode) to adapt the tty entries in the `/dev/directory`.

**CAUTION:** *When running `/etc/portconfig -m`, a at least one server must be connected to port A on MVME751.*

#### Installation of the Server

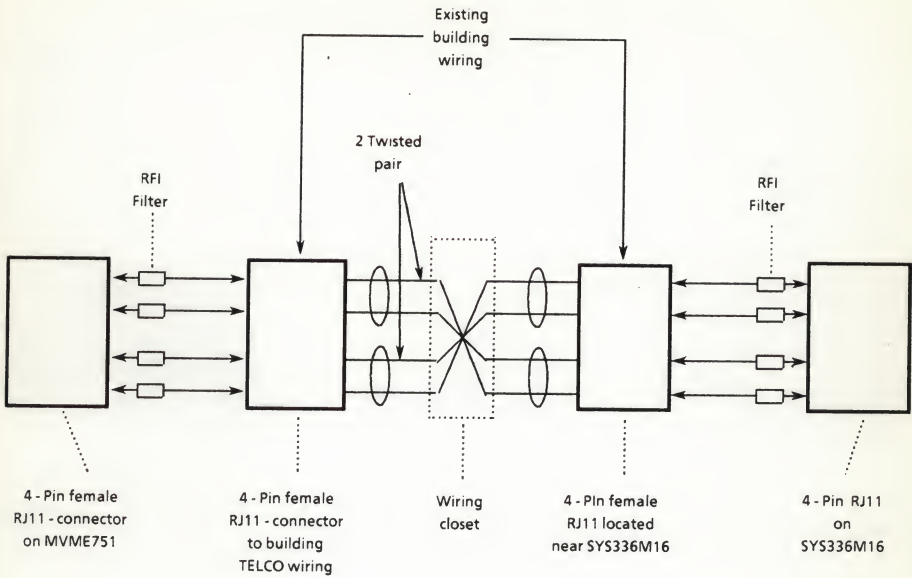
RS-232C compatible devices connected to the MVME336 Server  
Connect any RS-232C (terminals, printers, modems) to the 25-pin "D" connectors. Using a small, flat-bladed screw driver, tighten the screws in the external device's connector.

#### Connection to the Hub (MVME336)

The connection of the **Server** to the VME HUB module (MVME336) is accomplished by using a standard 4-wire modular telephone cable.

Snap one end of the cable into the mating connector on the Server connection panel. Snap the other end into the MVME751 Transition board connector on the host.

If the Server is to be located more than 15 meter from the Hub, some dual, twisted-pair telephone cable will need to be installed (unused pairs of existing telephone cable may be used). The total length of this run must be limited to 240 meter (excluding the 9 meter modular telephone cables used at each end). When installing this cable, a twist (or wire-swapping) in the line must be made. Instead of wiring one to one (pin1 to pin1, pin2 to pin2, etc.), invert the order (pin1 to pin4, pin2 to pin3, pin3 to pin2, pin4 to pin1).



See chapter 4 for VME-model positioning.

### 15.8.5 Maintenance

#### Test and Diagnostics (see chapter 3)

The MVME336 can be tested with the SSID tests.

The SYS336 M16 (**Server**) has a self test (see 15.8.3)

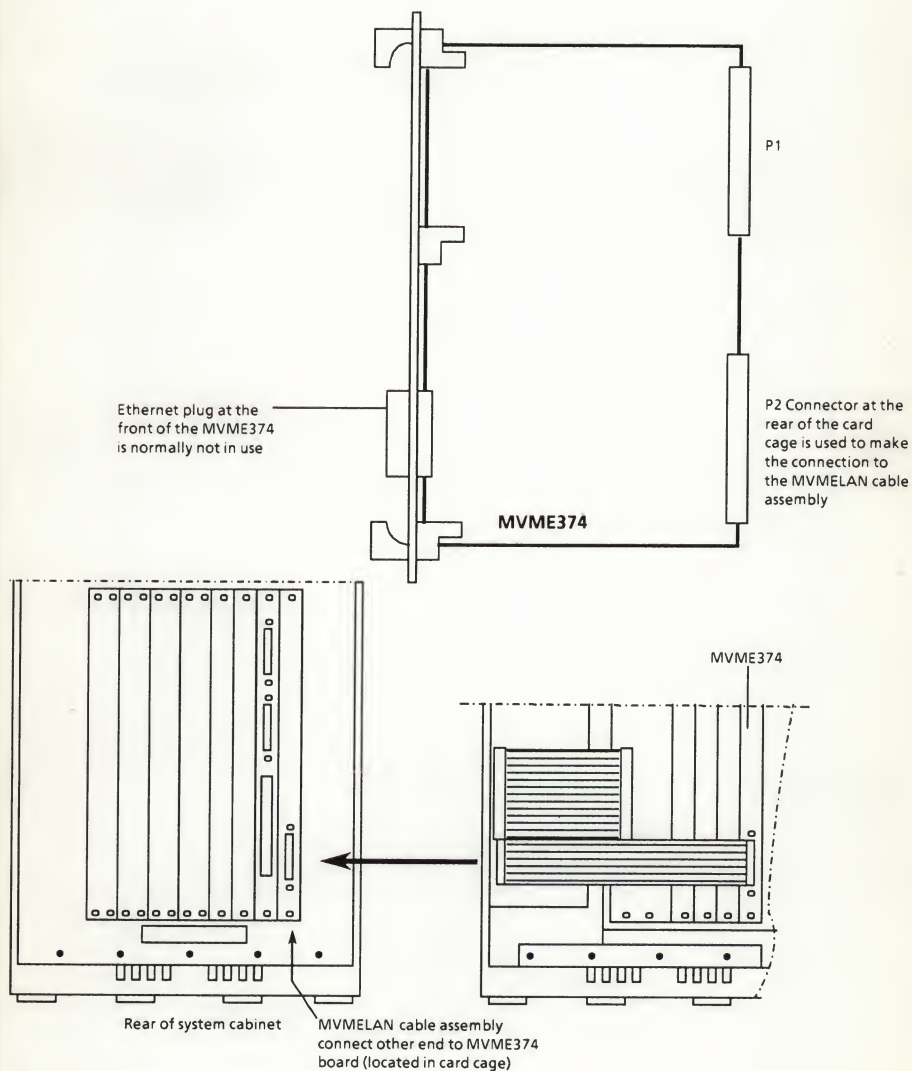


## 15.9 MVME374

### 15.9.1 Characteristics

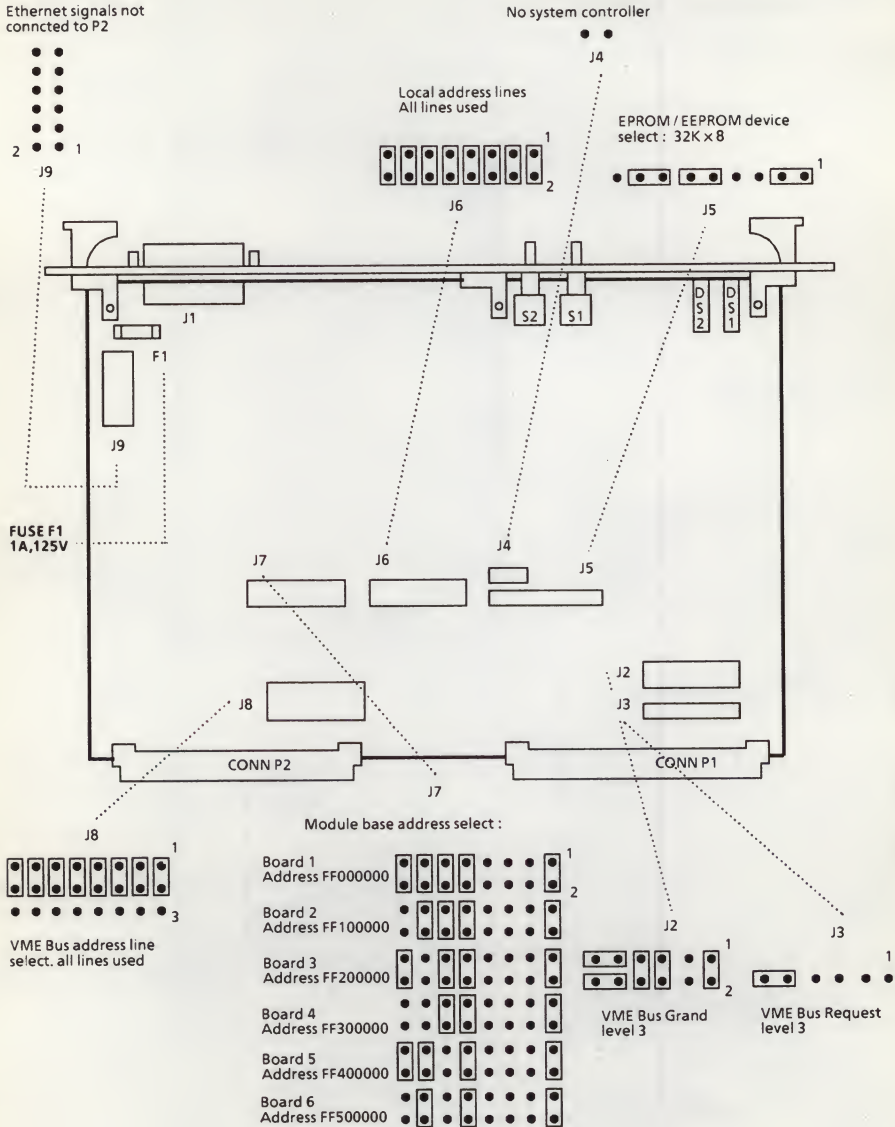
For the technical data, see section 15.1.

### 15.9.2 Connections



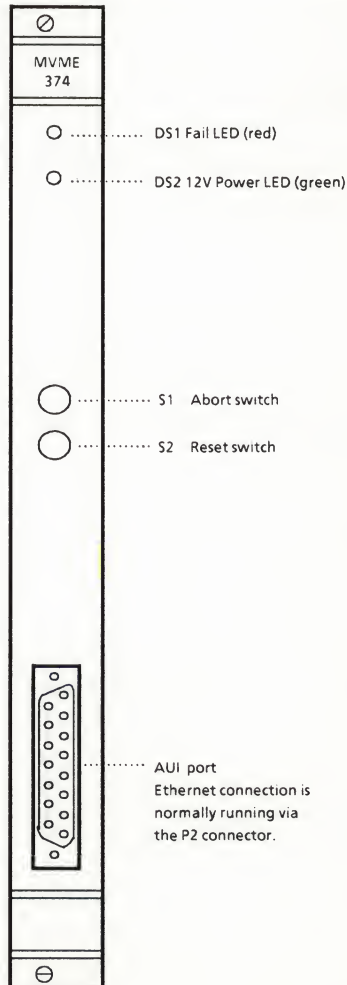


# 15.9.3 Strap Settings



## LEDs on the MVME374

| NAME | LED COLOUR | FUNCTION      |                                                                                                                                                                                                                                               |
|------|------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DS1  | RED        | Fail LED      | Lit when MVME374:<br>a) has been reset and is conducting self test.<br>b) has detected a failure of some portion of selftest.<br>c) is system controller.<br>d) the user's application turns it on.,<br>e) the MPU on the MVME374 has halted. |
| DS2  | GREEN      | 12V power LED | Lit whenever + 12Vdc fused power is supplied to the Ethernet front panel connector J1.                                                                                                                                                        |



## 15.9.4 Installation

For the installation and positioning rules, see chapter 2.

After all header jumpers are set in according to section 15.9.3 the board can be put in the card rack.

Make a connection from the P2 connector, at the rear of the backplane, to the MVMELAN cable assembly in the rear of the system cabinet. Attach a transceiver (Ethernet) cable to the MVMELAN cable assembly. This cable is not provided with the MVME374 module. Connect the other end of the cable to the Ethernet system.

When installing the MVME374 Ethernet controller the software belonging to this board must be installed onto the system, to do this **use** the Software Release Guide which belongs to this product.

## 15.9.5 Maintenance

The MVME374 has a built-in selftest, this test is started at power-up.

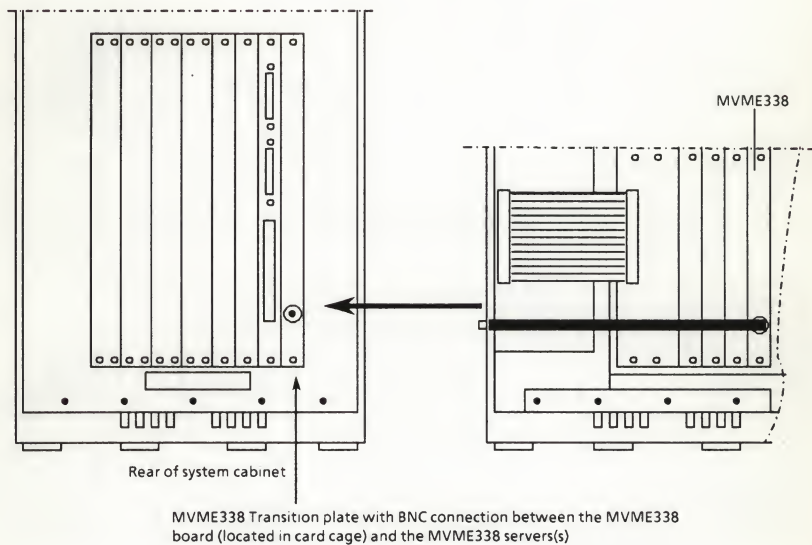
The MVME374 can also be tested using SSID. In this case minimal Rel. 5.1 of the SSID is required.

## 15.10 MVME338

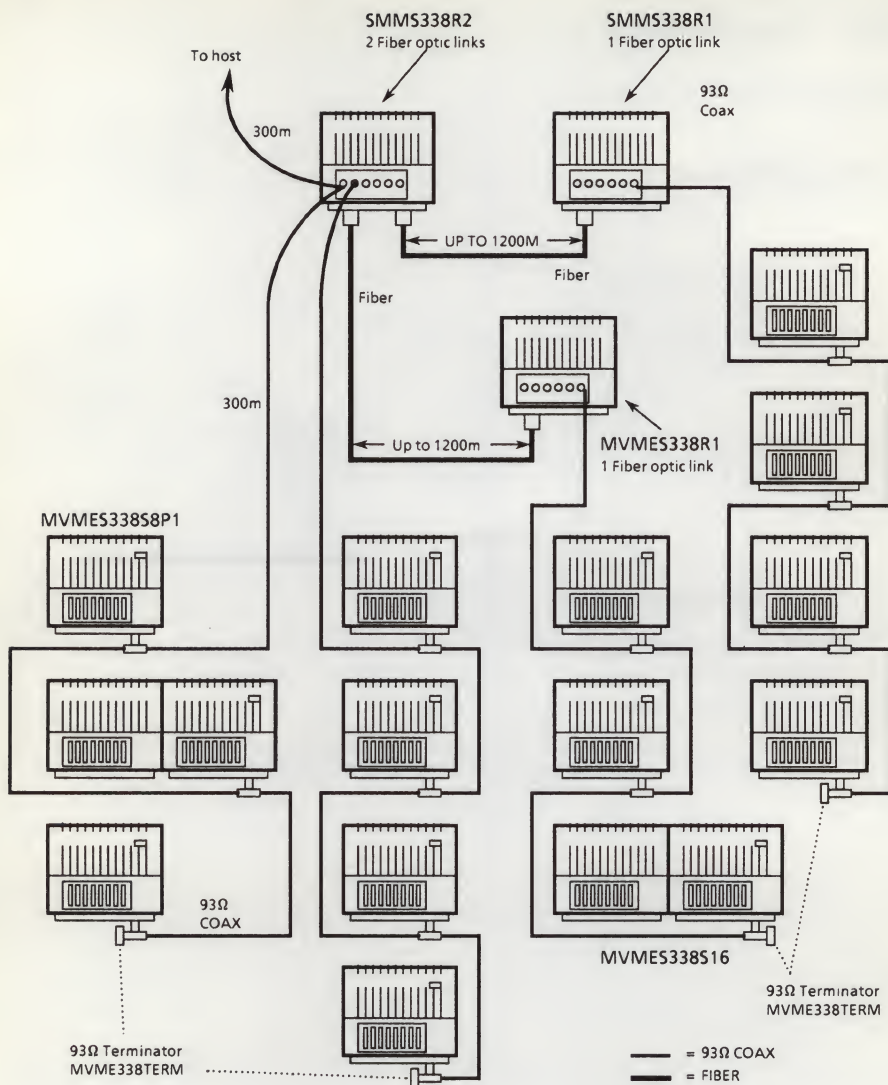
### 15.10.1 Characteristics

For the technical data, see section 15.1.

### 15.10.2 Connections



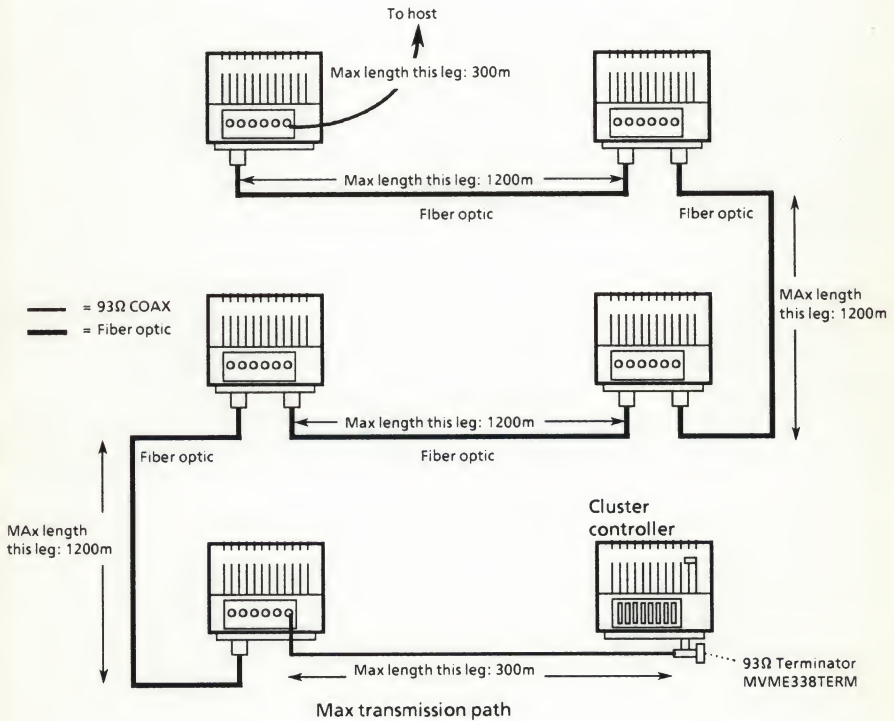




On any coaxial cable segment, depending on the number of nodes attached, the maximum length is 300 meters. The table below shows the relationship between nodes, and the maximum allowable cable run. Be aware, that NODES ARE DEFINED TO BE EITHER TERMINAL SERVERS OR A CONNECTION TO AN I/O CONTROLLER BOARD.

| NUMBER OF NODES | MAX. LENGTH OF CABLE (M) |
|-----------------|--------------------------|
| 8               | 300                      |
| 9               | 240                      |
| 10              | 210                      |
| 12              | 195                      |
| 12              | 180                      |
| 13              | 165                      |
| 14              | 150                      |
| 15              | 120                      |
| 16              | 105                      |

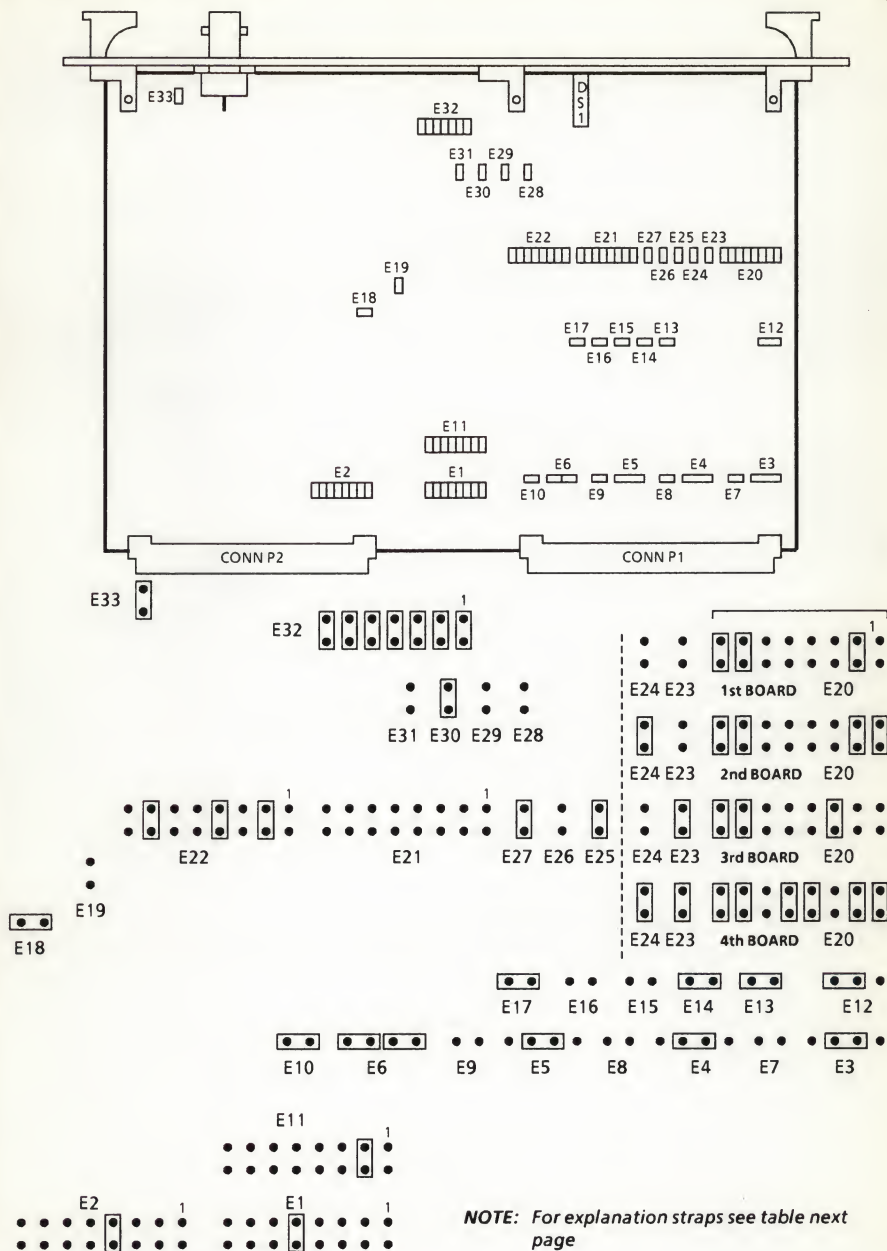
The maximum number of fibre optic links that may be chained together is four.



Repeaters may be connected to one other with up to 450m. coax cable if no servers are connected to that segment. If there are, the maximum length is 300m. The maximum number of servers that may be connected to such a segment is 5.

The maximum number of servers connected to a MVME338 controller is 15. The maximum number of terminals is software limited to 128, the hardware limit is 256 terminals.

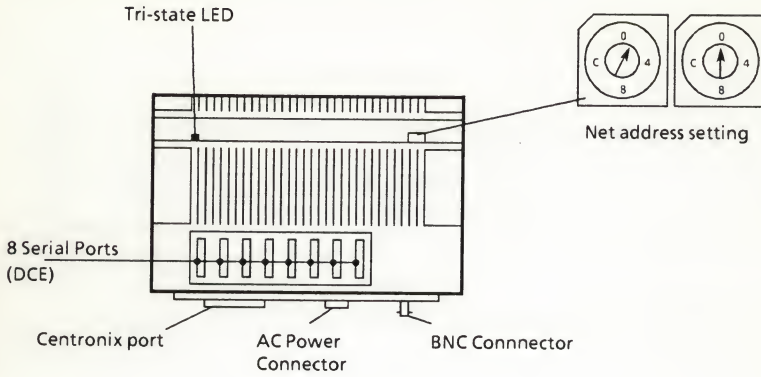
### 15.10.3 Strap Settings



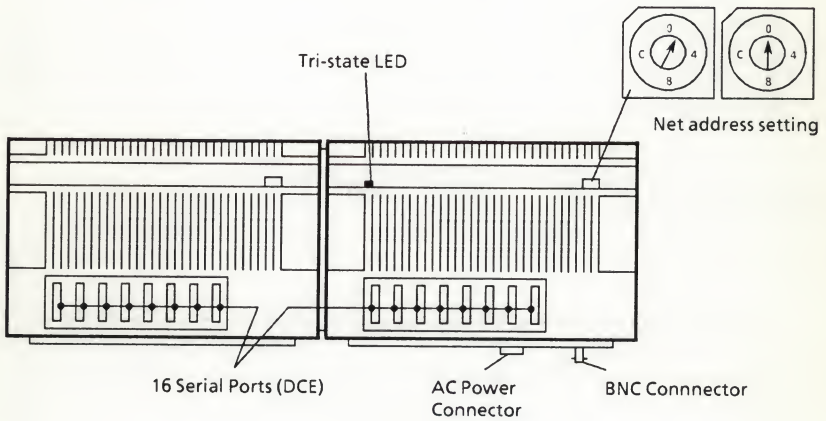


| STRAP               | MEANING                                        | SETTING                                                                                                                                      |
|---------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| E1,E2,E21,E23,E24   | VMEbus Base Address                            | 1st Board : EFF7C00<br>2nd Board : EFF7800<br>3rd Board : EFF7400<br>4th Board : EFF7000                                                     |
| E3                  | BG0IN, BG0OUT                                  | disabled                                                                                                                                     |
| E4                  | BG1IN, BG1OUT                                  | disabled                                                                                                                                     |
| E5                  | BG2IN, BG2OUT                                  | disabled                                                                                                                                     |
| E6                  | BG3IN, BG3OUT                                  | enabled                                                                                                                                      |
| E7                  | BR0                                            | disabled                                                                                                                                     |
| E8                  | BR1                                            | disabled                                                                                                                                     |
| E9                  | BR2                                            | disabled                                                                                                                                     |
| E10                 | BR3                                            | enabled                                                                                                                                      |
| E11                 | Interrupt ReQuest level                        | IRQ2                                                                                                                                         |
| E12                 | EPROM Size                                     | 27256                                                                                                                                        |
| E13,E14,E15,E16,E17 | Slave Address Modifier                         |                                                                                                                                              |
| E18                 | Watchdog Timer                                 | enabled                                                                                                                                      |
| E19                 | SYSFAIL                                        | disabled                                                                                                                                     |
| E20                 | Interrupt Vector                               | 1st Board : C2<br>2nd Board : C3<br>3rd Board : C4<br>4th Board : DB                                                                         |
| E25,E26,E27         | Interrupt Acknowledge Number                   | IACK2                                                                                                                                        |
| E28,E29,E30,E31     | Real Time Clock Period: 12.5, 25, 50 or 100 ms | 50ms                                                                                                                                         |
| E32                 | Network Node Address Setting                   | FF<br>(depending if more<br>then 1 ctrl is<br>connected to the same<br>network (cable))<br>Strap installed = 1<br>1st Board<br>11111111 = FF |
| E33                 | COAX Line Terminator                           | enabled                                                                                                                                      |

## Strap Settings MVMES338S8P, Terminal Server (8 serial ports 1 parallel)



## Strap Settings SMMS338S16, Terminal Server (16 serial ports)



## LED Indicators MVME338

### Top Tri-State LED

| STATE             | MEANING             |
|-------------------|---------------------|
| Flickering yellow | Running diagnostics |
| Green             | Normal operation    |
| Flashing red      | Diagnostic failure  |

## LED Indicators VMES338S8P1 and SMMS338S16 (SERVERS)

### Tri-state LED

| STATE              | MEANING                                         |
|--------------------|-------------------------------------------------|
| Flickering yellow  | Running diagnostics and network reconfiguration |
| Solid green        | Normal Operation                                |
| Solid flashing red | Malfunction detected (replace server)           |
| Flashing green     | Waiting for download                            |

## Led Indicator VMES338R0/1/2 (REPEATERS)

### Bi-state LED

| STATE           | MEANING                                    |
|-----------------|--------------------------------------------|
| Yellow          | Reapeater is idle (no traffic on the line) |
| Green           | Repeater is active (traffic on the line)   |
| Non-illuminated | Repeater is not receiving ac power         |

#### 15.10.4 Installation

For the installation and positioning rules, see chapter 2.

After all header jumpers are set in according to section 15.10.3 the board can be put in the card rack.

Make a connection from the coax plug at the front of the MVME338 board to the MVME338 transition plate in the rear of the system, see section 15.10.2.

Connect the MVME338 server(s) and MVME338 repeater(s), see section 15.10.2.

a) Turn all equipment power off.

When installing the MVME338 controller the software belonging to this board must be installed onto the system, to do this **use** the Software Release Guide which belongs to this product.

#### 15.10.6 Maintenance

The MVME338, Servers and Repeaters have built-in self tests, started when power is switched on.



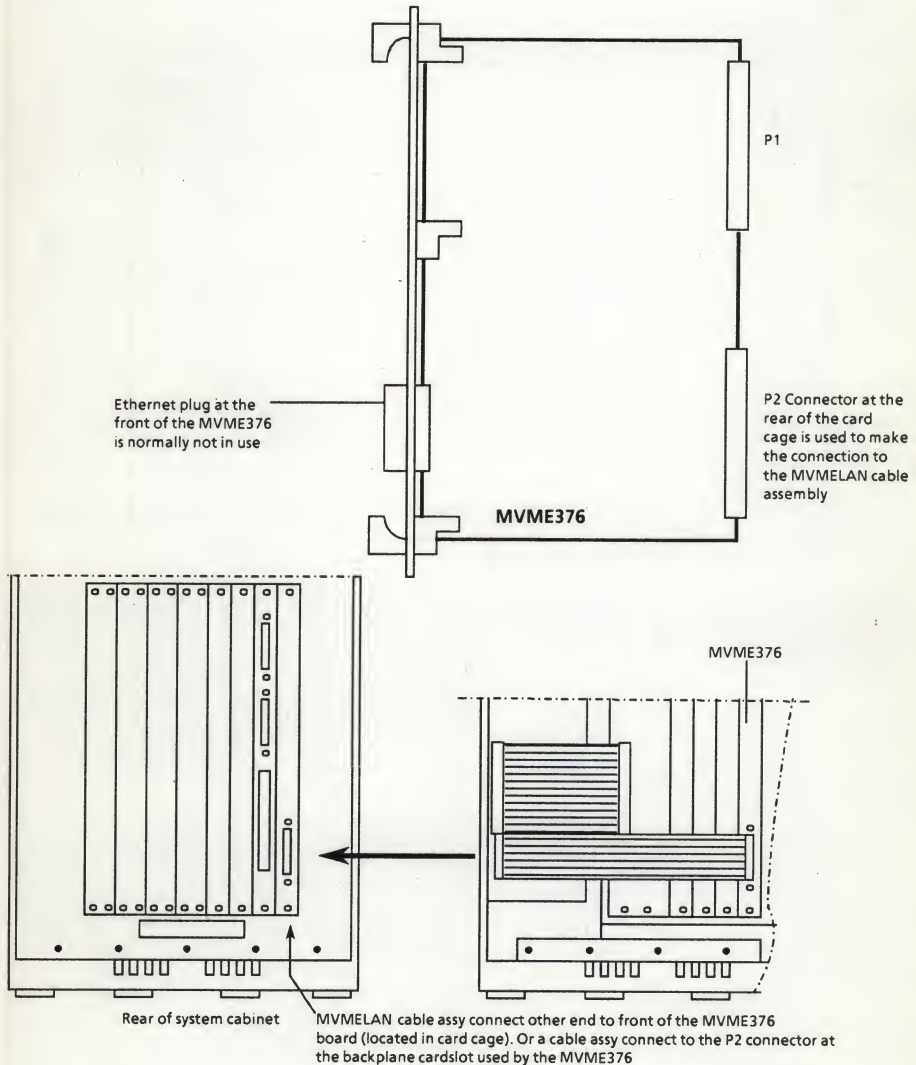


## 15.11 MVME376

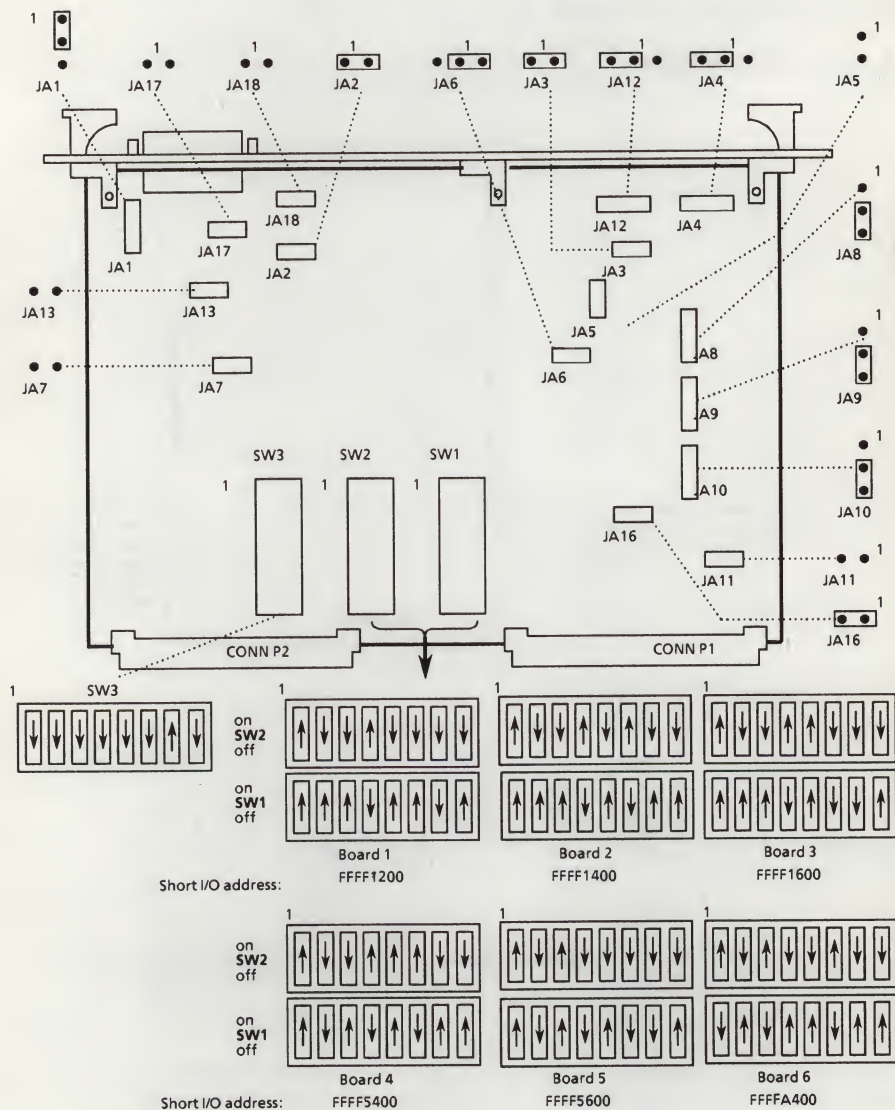
### 15.11.1 Characteristics

For the technical data, see section 15.1.

### 15.11.2 Connections



### 15.11.3 Strap Settings



## Straps on the MVME376

| NAME | SETTING    | FUNCTION                                                                                                                                                                                             |
|------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JA1  | 1-2        | + 12V (fused) transceiver power AUI connection P2 or front panel (front panel is set)                                                                                                                |
| JA2  | CLOSED     | Reserved for future use                                                                                                                                                                              |
| JA3  | CLOSED     | Parity check on data bits 0 through 31 (enabled)                                                                                                                                                     |
| JA4  | 2-3        | DTACK timing VMEbus slow or fast (set to fast)                                                                                                                                                       |
| JA5  | OPEN       | Reserved for future use                                                                                                                                                                              |
| JA6  | 1-2        | Source of DRAM at local bus address line 17 or 1 (set to 17)                                                                                                                                         |
| JA7  | OPEN       | Factory test point (set to interrupt test position)                                                                                                                                                  |
| JA8  | 2-3        | Special parity error reporting (disabled)                                                                                                                                                            |
| JA9  | 2-3        | VMEbus parity error reporting via BERR (disabled)                                                                                                                                                    |
| JA10 | 2-3        | SYSCLOCK supplied by VMEbus (disabled)                                                                                                                                                               |
| JA11 | OPEN       | SYSFAIL (disabled)                                                                                                                                                                                   |
| JA12 | 2-3        | Factory set, do not change, parity errors sensed by polling                                                                                                                                          |
| JA13 | OPEN       | AUI interface type (set to Ethernet version 2.0/IEEE 802.3 type)                                                                                                                                     |
| JA16 | CLOSED     | Factory set, do not change, A16 and A32 slave access only                                                                                                                                            |
| JA17 | OPEN       | Factory set, do not change                                                                                                                                                                           |
| JA18 | OPEN       | Factory set, do not change, AUI connector usage                                                                                                                                                      |
| SW1  | see figure | SW1-1 through SW1-7 set the address bits A15-A09 (on = 0)<br>SW1-8 selects the address modifiers that are permitted in the Short I/O 16bit space                                                     |
| SW2  | see figure | SW2-1 through SW2-6, set the address bits A23-A18 (on = 0)<br>SW2-7 selects address modifiers in the ext. 32bit address space<br>SW2-8 selects address modifiers in the standard 24bit address space |
| SW3  | see figure | SW3-1 through SW3-8, set the address bits A31-A24 (on = 0)                                                                                                                                           |



#### 15.11.4 Installation

For the installation and positioning rules, see chapter 2.

After all header jumpers are set in according to section 15.11.3 the board can be put in the card rack.

Make a connection from the P2 connector, at the rear of the backplane, or from the front panel connector (default) to the MVMELAN cable assembly in the rear of the system cabinet. Attach a transceiver (Ethernet) cable to the MVMELAN cable assembly. This cable is not provided with the MVME376 module. Connect the other end of the cable to the Ethernet system.

When installing the MVME376 Ethernet controller the software belonging to this board must be installed onto the system, to do this **use** the Software Release Guide which belongs to this product.

#### 15.11.5 Maintenance

The MVME376 has a built-in selftest, this test is started at power-up.

The MVME376 can also be tested using SSID. In this case minimal Rel. 2.2 (RISC), Rel. 7.2 (CISC) of the SSID is required.

## 18 DISK DRIVES

Section:

Page:

|       |                                   |         |
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| 1:    | Technical Data                    | 18.1-1  |
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| 1.3:  | Default Disk Definitions          | 18.1-6  |
| 1.3.1 | Disk Definitions for the MVME147  | 18.1-6  |
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| 1.3.4 | Disk Definitions for the MVME327A | 18.1-11 |
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|    |                                                       |        |        |        |        |        |
|----|-------------------------------------------------------|--------|--------|--------|--------|--------|
| 2: | MVME831/832/831XT/832XT and MVME883 TEAC FD 55 drives | 18.2-1 | 18.2-1 | 18.2-2 | 18.2-7 | 18.2-7 |
| 3: | MVME831XT/832XT/881/883 TEAC FD-55GFR 606-U           | 18.3-1 | 18.3-1 | 18.3-2 | 18.3-7 | 18.3-8 |
| 4: | OMT17000 SCSI adapter                                 | 18.4-1 | 18.4-1 | 18.4-2 | 18.4-3 | 18.4-3 |
| 5: | MVME841 Micropolis 1325                               | 18.5-1 | 18.5-1 | 18.5-2 | 18.5-4 | 18.5-4 |
| 6: | MVME842 CDC WREN III ESDI                             | 18.6-1 | 18.6-1 | 18.6-2 | 18.6-3 | 18.6-3 |
| 7: | MVME843 CDC WREN V ESDI                               | 18.7-1 | 18.7-1 | 18.7-2 | 18.7-3 | 18.7-4 |
| 8: | MVME862/872 Seagate ST-157N SCSI                      | 18.8-1 | 18.8-1 | 18.8-2 | 18.8-3 | 18.8-3 |

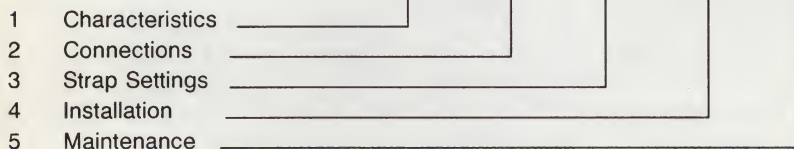
Subsection:

|   |                 |  |
|---|-----------------|--|
| 1 | Characteristics |  |
| 2 | Connections     |  |
| 3 | Strap Settings  |  |
| 4 | Installation    |  |
| 5 | Maintenance     |  |

**NOTE:** n.a. means that this section is not available for this unit.

|                                               |         |         |         |         |         |
|-----------------------------------------------|---------|---------|---------|---------|---------|
| 9: MVME863/864<br>CDC Swift 94351             | 18.9-1  | 18.9-1  | 18.9-2  | 18.9-3  | 18.9-4  |
| 10: MVME863A/864A<br>Fujitsu M2613ESA/2614ESA | 18.10-1 | 18.10-1 | 18.10-2 | 18.10-4 | 18.10-4 |
| 11: MVME865/866<br>Fujitsu M2622SA/2624SA     | 18.11-1 | 18.11-1 | 18.11-2 | 18.11-3 | 18.11-3 |
| 12: MVME873<br>Seagate ST296N SCSI            | 18.12-1 | 18.12-1 | 18.12-2 | 18.12-3 | 18.12-3 |
| 13: MVME874<br>CDC WREN III SCSI              | 18.13-1 | 18.13-1 | 18.13-2 | 18.13-4 | 18.13-4 |
| 14: MVME875<br>CDC WREN IV SCSI               | 18.14-1 | 18.14-1 | 18.14-2 | 18.14-3 | 18.14-3 |
| 15: MVME876<br>CDC WREN V SCSI                | 18.15-1 | 18.15-1 | 18.15-2 | 18.15-3 | 18.15-3 |
| 16: MVME877<br>CDC WREN VII SCSI              | 18.16-1 | 18.16-1 | 18.16-2 | 18.16-3 | 18.16-3 |
| 17: MVME881A<br>TEAC FD-55GS 7510U SCSI       | 18.17-1 | 18.17-1 | 18.17-2 | 18.17-3 | 18.17-3 |
| 18: MVME884<br>TEAC FD-235 JS-401 SCSI        | 18.18-1 | 18.18-1 | 18.18-2 | 18.18-3 | 18.18-3 |

Subsection:



**NOTE:** *n.a. means that this section is not available for this unit.*

## 18.1 TECHNICAL DATA

### 18.1.1 Flexible disk drives

| Flexible disk drives                | MVME831<br>MVME832                          | MVME<br>831XT<br>832XT                      | MVME881                                     | MVME<br>881A                                | MVME883                                     | MVME884                         |
|-------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------|
| Manufacturer type                   | Teac FD-55FV                                | Teac FD-55FV17U                             | Teac FD-55FR-606 & OMTI adapt               | Teac FD-55GFR 701-U                         | Teac FD-55FV17U                             | Teac FD-235 JS-401              |
| Unformatted capacity                | 1Mbyte                                      | 1.6Mbyte                                    | 1.6Mbyte                                    | 1.6Mbyte                                    | 1.6Mbyte                                    | *                               |
| Formatted capacity                  | 653Kbyte                                    | 1228Kbyte                                   | 1228Kbyte                                   | 1228Kbyte                                   | 1228Kbyte                                   | *                               |
| Form fit                            | 5.25" half height                           | 5.25" half height                           | 5.25" full height                           | 5.25" half height                           | 5.25" half height                           | 3.5" half height                |
| No of sectors/track                 | 16                                          | 15                                          | 15                                          | 15                                          | 15                                          | *                               |
| No of user cylinders                | 256                                         | 512                                         | 512                                         | 512                                         | 512                                         | *                               |
| No of bytes/sector                  | 80                                          | 80                                          | 80                                          | 80                                          | 80                                          | 80                              |
| No of heads                         | 2                                           | 2                                           | 2                                           | 2                                           | 2                                           | 2                               |
| Servo information                   | no                                          | no                                          | no                                          | no                                          | no                                          | no                              |
| Interface                           | SA400                                       | SA400                                       | SCSI                                        | SCSI                                        | SA400                                       | SCSI                            |
| Controller                          | MVME 320A<br>320B                           | MVME 320B                                   | MVME147                                     | MVME147<br>MVME187<br>MVME328               | MVME 327A                                   | MVME147                         |
| Power consumption                   | 5.25 watt                                   | 5.25 watt                                   | 4 watt                                      | 4 watt                                      | 4 watt                                      | 4 wat                           |
| Power requirements<br>+ 5V<br>+ 12V | In Amps<br>Typ Max<br>0.3 0.46<br>0.25 0.58 | In Amps<br>Typ Max<br>0.35 0.55<br>0.22 1.0 | In Amps<br>Typ Max<br>0.35 0.55<br>0.22 1.0 | In Amps<br>Typ Max<br>0.35 0.55<br>0.22 1.0 | In Amps<br>Typ Max<br>0.35 0.55<br>0.22 1.0 | In Amps<br>Typ Max<br>0.44 0.74 |
| Test programs                       | Processor bug and SSID                      | Processor bug and SSID                      | Processor bug and SSID                      | Processor bug and SSID                      | Processor bug and SSID                      | Processor bug and SSID          |
| Remarks                             | ECD                                         | MVME332 XT is ECD                           | ECD                                         |                                             |                                             |                                 |

\* Media dependent

ECD stands for End Commercial Delivery



## 18.1.2 Fixed disk drives

| Fixed disk drives                   | MVME841                          | MVME842                                      | MVME843                                      |
|-------------------------------------|----------------------------------|----------------------------------------------|----------------------------------------------|
| Manufacturer type                   | Micropolis 1325                  | CDC WREN III 94166                           | CDC WREN V 94186                             |
| Unformatted capacity                | 85.3Mbyte                        | 182Mbyte                                     | 442Mbyte                                     |
| Formatted capacity                  | 67Mbyte                          | 161Mbyte                                     | 390Mbyte                                     |
| Form fit                            | 5.25" full height                | 5.25" full height                            | 5.25" full height                            |
| No of sectors/track                 | 32                               | 36                                           | 36                                           |
| No of bytes/sector                  | 256                              | 512                                          | 512                                          |
| No of user cylinders                | 1024                             | 968                                          | 1412                                         |
| No of heads                         | 8                                | 9                                            | 15                                           |
| Servo information                   | yes                              | yes                                          | yes                                          |
| Interface                           | ST506                            | ESDI                                         | ESDI                                         |
| Controller                          | MVME320A<br>MVME320B             | MVME323                                      | MVME323                                      |
| Power consumption                   | 38 watt                          | 21 watt                                      | 24 watt                                      |
| Power requirements<br>+ 5V<br>+ 12V | Typ 0.9A<br>Max 3.3A    Typ 3.9A | Typ 0.8A<br>Max 1.0A    Typ 1.4A    Max 2.3A | Typ 0.8A<br>Max 1.1A    Typ 2.0A    Max 2.7A |
| Test programs                       | Processor bug and SSID           | Processor bug and SSID                       | Processor bug and SSID                       |
| Remarks                             | End Commercial Delivery          |                                              |                                              |

| Fixed disk drives                   | MVME862<br>MVME872<br>*       | MVME863                             | MVME863A                          | MVME864                             | MVME864A                          |
|-------------------------------------|-------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| Manufacturer type                   | Seagate<br>ST157NM            | CDCSwift<br>94351-126               | Fujitsu<br>M2613ESA               | CDC swift<br>94351-200S             | Fujitsu<br>M2613ESA               |
| Unformatted capacity                | 57Mbyte                       | 126Mbyte                            | 126Mbyte<br>172Mbte *             | 200Mbyte                            | 200Mbyte<br>229Mbyte *            |
| Formatted capacity                  | 41Mbyte                       | 104Mbyte                            | 104Mbyte<br>135Mbyte *            | 172Mbyte                            | 172Mbte<br>180Mbtye *             |
| Form fit                            | 3.5"<br>half height           | 3.5"<br>half height                 | 3.5"<br>half height               | 3.5"<br>half height                 | 3.5"<br>half height               |
| No of sectors/track                 | 26                            | 28                                  | 28                                | 35                                  | 35                                |
| No of bytes/sector                  | 512                           | 512                                 | 512                               | 512                                 | 512                               |
| No of user cylinders                | 608                           | 1067                                | 1067<br>1334 *                    | 1067                                | 1065<br>1334 *                    |
| No of heads                         | 6                             | 7                                   | 6                                 | 9                                   | 8                                 |
| Servo information                   | yes                           | yes                                 | yes                               | yes                                 | yes                               |
| Interface                           | SCSI                          | SCSI                                | SCSI                              | SCSI                                | SCSI                              |
| Controller                          | MVME147<br>MVME327            | MVME147<br>MVME327                  | MVME147<br>MVME327                | MVME147<br>MVME327                  | MVME147<br>MVME327                |
| Power consumption                   | 11 watt                       | 11 watt                             | 9 watt                            | 11 watt                             | 9 watt                            |
| Power requirements<br>+ 5V<br>+ 12V | Typ Max<br>1.2A<br>2.0A       | Typ Max<br>0.55A 0.75A<br>0.7A 0.8A | Typ Max<br>0.6A 0.7A<br>0.3A 1.6A | Typ Max<br>0.55A 0.75A<br>0.7A 0.8A | Typ Max<br>0.6A 0.7A<br>0.3A 1.6A |
| Test programs                       | Processor<br>bug and<br>SSID  | Processor<br>bug and<br>SSID        | Processor<br>bug and<br>SSID      | Processor<br>bug and<br>SSID        | Processor<br>bug and<br>SSID      |
| Remarks                             | End<br>Commercial<br>Delivery | End<br>Commercial<br>Delivery       |                                   | End<br>Commercial<br>Delivery       |                                   |

#### Notes

\* The MVME872 is the same as the MVME862 only with a 5.25" front panel.

\*\* The MVME863A and MVME864A are the successors of the MVME863 and MVME864. The first capacity indicated is when used as it is an MVME863 and an MVME864.

| Fixed disk drives                   | MVME865                                  | MVME866                                  |
|-------------------------------------|------------------------------------------|------------------------------------------|
| Manufacturer type                   | Fujitsu M2622SA                          | Fujitsu M2624SA                          |
| Unformatted capacity                | 387Mbyte                                 | 610Mbyte                                 |
| Formatted capacity                  | 330Mbyte                                 | 520Mbyte                                 |
| Form fit                            | 3.5" half height                         | 3.5" half height                         |
| No of sectors/track                 | 64                                       | 64                                       |
| No of bytes/sector                  | 512                                      | 512                                      |
| No of user cylinders                | 1442                                     | 1442                                     |
| No of heads                         | 7                                        | 11                                       |
| Servo information                   | yes                                      | yes                                      |
| Interface                           | SCSI                                     | SCSI                                     |
| Controller                          | MVME147<br>MVME187<br>MVME327<br>MVME328 | MVME147<br>MVME187<br>MVME327<br>MVME328 |
| Power consumption                   | 11 watt                                  | 11 watt                                  |
| Power requirements<br>+ 5V<br>+ 12V | Typ    Max<br>1.0A<br>2.0A               | Typ    Max<br>1.0A<br>2.0A               |
| Test programs                       | Processor bug and SSID                   | Processor bug and SSID                   |
| Remarks                             |                                          |                                          |

| Fixed disk drives                   | MVME873                                  | MVME874                                  | MVME875                                  | MVME876                                  | MVME877                                  |
|-------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| Manufacturer type                   | Seagate ST296N                           | CDC WREN III 94161                       | CDC WREN IV 94171                        | CDC WREN V 94181                         | CDC WREN VII 94601                       |
| Unformatted capacity                | 97.6Mbyte                                | 182Mbyte                                 | 348Mbyte                                 | 600Mbyte                                 | 1200Mbyte                                |
| Formatted capacity                  | 80Mbyte                                  | 155Mbyte                                 | 307Mbyte                                 | 574Mbyte                                 | 1035Mbyte                                |
| Form fit                            | 5.25" half height                        | 5.25" half height                        | 5.25" half height                        | 5.25" half height                        | 5.25" half height                        |
| No of sectors/track                 | 34                                       | 36                                       | 46                                       | 52                                       | 69                                       |
| No of bytes/sector                  | 512512                                   | 512                                      | 512                                      | 512                                      | 512                                      |
| No of user cylinders                | 817                                      | 967                                      | 1409                                     | 1549                                     | 1931                                     |
| No of heads                         | 6                                        | 9                                        | 9                                        | 15                                       |                                          |
| Servo information                   | yes                                      | yes                                      | yes                                      | yes                                      | yes                                      |
| Interface                           | SCSI                                     | SCSI                                     | SCSI                                     | SCSI                                     | SCSI                                     |
| Controller                          | MVME147<br>MVME187<br>MVME327<br>MVME328 | MVME147<br>MVME187<br>MVME327<br>MVME328 | MVME147<br>MVME187<br>MVME327<br>MVME328 | MVME147<br>MVME187<br>MVME327<br>MVME328 | MVME147<br>MVME187<br>MVME327<br>MVME328 |
| Power consumption                   | 15 watt                                  | 21 watt                                  | 24 watt                                  | 24 watt                                  | 31 watt                                  |
| Power requirements<br>+ 5V<br>+ 12V | Typ Max<br>1.3A 1.8A<br>0.5A 0.5A        | Typ Max<br>0.8A 1.3A<br>1.4A 2.4A        | Typ Max<br>1.1A 1.4A<br>1.5A 4.5A        | Typ Max<br>1.1A 1.2A<br>2.7A 4.5A        | Typ Max<br>0.8A 1.1A<br>1.6A 4.5A        |
| Test programs                       | Processor bug and SSID                   | Processor bug and SSID                   | Processor bug and SSID                   | Processor bug and SSID                   | Processor bug and SSID                   |
| Remarks                             | ECD                                      |                                          |                                          |                                          |                                          |



## 18.1.3 Default Disk Definitions

### 18.1.3.1 Disk Definitions for the MVME147

|                         | m147sea40      | m147sea80      | m147swift126 | m147swift201 |
|-------------------------|----------------|----------------|--------------|--------------|
| Comment                 | Seagate ST157N | Seagate ST296N | Swift 107Mb  | Swift 172Mb  |
| Disk type               | 5122           | 3842           | 4866         | 4866         |
| Format command          | (none)         | (none)         | (none)       | (none)       |
| Diagnostic tracks       | no             | no             | no           | no           |
| Bad spot strategy       | PERFECT        | PERFECT        | PERFECT      | PERFECT      |
| Max. no. of bad spots   | 100            | 100            | 100          | 100          |
| Number of sectors       | 94848          | 165850         | 209132       | 335475       |
| Sector size (in bytes)  | 512            | 512            | 512          | 512          |
| Sectors per track       | 26             | 34             | 28           | 35           |
| Cylinders               | 608            | 812            | 1067         | 1065         |
| Heads                   | 6              | 6              | 7            | 9            |
| Precomp. cylinder       | 608            | 812            | 1067         | 1065         |
| Sector interleave       | 3              | 3              | 1            | 1            |
| Spiral offset           | 0              | 0              | 0            | 0            |
| Step rate               | 0              | 0              | 0            | 0            |
| Starting head number    | 0              | 0              | 0            | 0            |
| ECC error length        | 0              | 0              | 0            | 0            |
| Attributes mask (hex)   | 10             | 10             | 10           | 10           |
| Ext. attr. mask (hex)   | 0              | 0              | 0            | 0            |
| Attributes word (hex)   | 10             | 10             | 10           | 10           |
| Ext. attr. word (hex)   | 0              | 0              | 0            | 0            |
| Gap byte 1 (hex)        | 0              | 0              | 0            | 0            |
| Gap byte 2 (hex)        | 0              | 0              | 0            | 0            |
| Gap byte 3 (hex)        | 0              | 0              | 0            | 0            |
| Gap byte 4 (hex)        | 0              | 0              | 0            | 0            |
| Controller attr. (hex)  | 850            | 850            | 50           | 50           |
| Unform. sector size     | 0              | 0              | 0            | 0            |
| Sector slip count       | 1              | 1              | 1            | 1            |
| Slice count             | 8              | 8              | 8            | 8            |
| Root filesys offset     | 324            | 324            | 324          | 324          |
| Root filesyst size R3V5 | 29160          | 29160          | 29160        | 29160        |
| R3V6                    | 26000          | 32648          | 40000        | 60000        |
| /usr filesyst size R3V5 | 35880          | 106680         | 150164       | 106920       |
| R3V6                    | 52200          | 116352         | 148484       | 180000       |
| /usr filesystem slice   | 2              | 2              | 2            | 2            |
| Swap size R3V5          | 29160          | 29160          | 29160        | 29160        |
| R3V6                    | 16000          | 16000          | 20000        | 40000        |
| Swap slice              | 1              | 1              | 1            | 1            |
| End-of-disk res. area   | 0              | 0              | 0            | 0            |
| Alternates list         | (1) 1          | (3) 1-3        | (1) 1        | (1) 1        |
| read bad list cmd       | (none)         | (none)         | (none)       | (none)       |

# Disk Definitions for the MVME147 (continued)

|                        | m147cdcIII                 | m147cdcIV        | m147cdcV         | m147cdcVII     |
|------------------------|----------------------------|------------------|------------------|----------------|
| Comment                | WREN III 155Mb             | WREN IV 300Mb    | WREN V 60        | WREN VII 1.2Gb |
| Disk type              | 4098                       | 4866             | 4866             | 4866           |
| Format command         | (none)                     | (none)           | (none)           | (none)         |
| Diagnostic tracks      | no                         | no               | no               | no             |
| Bad spot strategy      | PERFECT                    | PERFECT          | PERFECT          | PERFECT        |
| Max. no. of bad spots  | 100                        | 100              | 100              | 100            |
| Number of sectors      | 304605                     | 597699           | 1195740          | 3997170        |
| Sector size (in bytes) | 512                        | 512              | 512              | 512            |
| Sectors per track      | 35                         | 47               | 52               | 69             |
| Cylinders              | 967                        | 1413             | 1533             | 1931           |
| Heads                  | 9                          | 9                | 15               | 15             |
| Precomp. cylinder      | 967                        | 1413             | 1533             | 1931           |
| Sector interleave      | 0                          | 0                | 1                | 1              |
| Spiral offset          | 0                          | 0                | 0                | 0              |
| Step rate              | 0                          | 0                | 0                | 0              |
| Starting head number   | 0                          | 0                | 0                | 0              |
| ECC error length       | 0                          | 0                | 0                | 0              |
| Attributes mask (hex)  | 10                         | 10               | 10               | 0              |
| Ext. attr. mask (hex)  | 0                          | 0                | 0                | 0              |
| Attributes word (hex)  | 10                         | 10               | 10               | 10             |
| Ext. attr. word (hex)  | 0                          | 0                | 0                | 0              |
| Gap byte 1 (hex)       | 0                          | 0                | 0                | 0              |
| Gap byte 2 (hex)       | 0                          | 0                | 0                | 0              |
| Gap byte 3 (hex)       | 0                          | 0                | 0                | 0              |
| Gap byte 4 (hex)       | 0                          | 0                | 0                | 0              |
| Controller attr. (hex) | 50                         | 850              | 850              | 150            |
| Uniform. sector size   | 0                          | 0                | 0                | 0              |
| Sector slip count      | 1                          | 1                | 1                | 1              |
| Slice count            | 8                          | 8                | 8                | 8              |
| Root fileys offset     | 324                        | 324              | 324              | 324            |
| Root fileys size       | R3V5 29160<br>R3V6 60000   | 29160<br>60000   | 29160<br>60000   | -<br>100000    |
| /usr fileys size       | R3V5 106920<br>R3V6 180000 | 106920<br>180000 | 106920<br>180000 | -<br>250000    |
| /usr filesystem slice  | 2                          | 2                | 2                | 2              |
| Swapsize               | R3V5 29160<br>R3V6 40000   | 29160<br>40000   | 29160<br>40000   | -<br>50000     |
| Swap slice             | 1                          | 1                | 1                | 1              |
| End-of-disk res. area  | 0                          | 0                | 0                | 0              |
| Alternates list        | (0)                        | (1) 1            | (1) 1            | (1) 1          |
| read bad list cmd      | (none)                     | (none)           | (none)           | (none)         |

# Disk Definitions for the MVME147 Floppies

|                        | m147<br>dsdd5           | m147<br>pcat             | m147<br>pcxt8            | m147<br>pcxt9            | m147<br>pcxt9_3                | m147ps2                 | m147shd          |
|------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------------|-------------------------|------------------|
| Comment                | 655kb<br>dsdd<br>floppy | 1.2Mb<br>PC/AT<br>floppy | 320kb<br>PC/XT<br>floppy | 360kb<br>PC/XT<br>floppy | 720kb<br>PC/XT<br>31/2" floppy | 1.4Mb<br>PS/2<br>floppy | 2.88Mb<br>floppy |
| Disk type              | 3840                    | 3480                     | 3840                     | 3840                     | 3840                           | 3840                    | 3840             |
| Format command         | (none)                  | (none)                   | (none)                   | (none)                   | (none)                         | (none)                  | (none)           |
| Diagnostic tracks      | no                      | no                       | no                       | no                       | no                             | no                      | no               |
| Bad spot strategy      | PERFECT                 | PERFECT                  | PERFECT                  | PERFECT                  | PERFECT                        | PERFECT                 | PERFECT          |
| Max. no. of bad spots  | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Number of sectors      | 2560                    | 2400                     | 640                      | 720                      | 1440                           | 2880                    | 5760             |
| Sector size (in bytes) | 256                     | 512                      | 512                      | 512                      | 512                            | 512                     | 512              |
| Sectors per track      | 16                      | 15                       | 8                        | 9                        | 9                              | 18                      | 36               |
| Cylinders              | 80                      | 80                       | 40                       | 40                       | 80                             | 80                      | 80               |
| Heads                  | 2                       | 2                        | 2                        | 2                        | 2                              | 2                       | 2                |
| Precomp. cylinder      | 80                      | 80                       | 40                       | 40                       | 80                             | 80                      | 80               |
| Sector interleave      | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Spiral offset          | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Step rate              | 100                     | 75                       | 100                      | 100                      | 100                            | 100                     | 100              |
| Starting head number   | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| ECC error length       | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Attributes mask (hex)  | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Ext. attr. mask (hex)  | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Attributes word (hex)  | 0                       | 28f                      | 0                        | 0                        | 0                              | 0                       | 0                |
| Ext. attr. word (hex)  | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Gap byte 1 (hex)       | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Gap byte 2 (hex)       | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Gap byte 3 (hex)       | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Gap byte 4 (hex)       | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Controller attr. (hex) | 207                     | 0                        | 285                      | 285                      | 28f                            | 28f                     | 28f              |
| Uniform. sector size   | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Sector slip count      | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Slice count            | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Root filesystem offset | 6                       | 15                       | 6                        | 6                        | 6                              | 6                       | 6                |
| Root filesystem size   | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| /usr filesystem size   | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| /usr filesystem slice  | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Swapsizes              | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Swap slice             | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| End-of-disk res. area  | 0                       | 0                        | 0                        | 0                        | 0                              | 0                       | 0                |
| Alternates list        | (0)                     | (0)                      | 0                        | 0                        | 0                              | 0                       | 0                |
| read bad list cmd      | (none)                  | (none)                   | (none)                   | (none)                   | (none)                         | (none)                  | (none)           |



### 18.1.3.2 Disk Definitions for the MVME320

|                        | m32070m                | m320dsdd5  | m320sdsdd5  |
|------------------------|------------------------|------------|-------------|
| Comment                | 70Mb Micropolis        | 655Kb dsdd | 1.2Mb PC/AT |
| Disk type              | 32004                  | 32010      | 32011       |
| Format command         | (none)                 | (none)     | (none)      |
| Diagnostic tracks      | yes                    | no         | no          |
| Bad spot strategy      | SOFTWARE               | PERFECT    | PERFECT     |
| Max. no. of bad spots  | 100                    | 0          | 0           |
| Number of sectors      | 262144                 | 2560       | 4800        |
| Sector size (in bytes) | 256                    | 256        | 512         |
| Sectors per track      | 32                     | 16         | 15          |
| Cylinders              | 1024                   | 80         | 80          |
| Heads                  | 8                      | 2          | 2           |
| Precomp. cylinder      | 1025                   | 0          | 0           |
| Sector interleave      | 11                     | 1          | 1           |
| Spiral offset          | 0                      | 0          | 0           |
| Step rate              | 0                      | 6          | 6           |
| Starting head number   | 0                      | 0          | 0           |
| ECC error length       | 11                     | 0          | 0           |
| Attributes mask (hex)  | 0                      | 0          | 0           |
| Ext. attr. mask (hex)  | 0                      | 0          | 0           |
| Attributes word (hex)  | 10                     | 4f         | 0           |
| Ext. attr. word (hex)  | 0                      | 0          | 0           |
| Gap byte 1 (hex)       | 0                      | 0          | 0           |
| Gap byte 2 (hex)       | 0                      | 0          | 0           |
| Gap byte 3 (hex)       | 0                      | 0          | 0           |
| Gap byte 4 (hex)       | 0                      | 0          | 0           |
| Controller attr. (hex) | 0                      | 0          | 0           |
| Unform. sector size    | 0                      | 0          | 0           |
| Sector slip count      | 0                      | 0          | 0           |
| Slice count            | 8                      | 0          | 0           |
| Root filesys offset    | 640                    | 6          | 15          |
| Root filesystem size   | 26880                  | 0          | 0           |
| /usr filesystem size   | 84352                  | 0          | 0           |
| /usr filesystem slice  | 2                      | 0          | 0           |
| Swap size              | 17280                  | 0          | 0           |
| Swap slice             | 1                      | 0          | 0           |
| End-of-disk res. area  | 1280                   | 0          | 0           |
| Alternates list        | (136) 16-79, 8120-8191 | (0)        | (0)         |
| read bad list cmd      | (none)                 | (none)     | (none)      |



### 18.1.3.3 Disk Definitions for the MVME323

|                        | m323182                                | m323182s                   | m323390               | m323390s                    |
|------------------------|----------------------------------------|----------------------------|-----------------------|-----------------------------|
| Comment                | 182Mb CDC                              | 182Mb CDC<br>(sector slip) | 390Mb CDC             | 390Mb CDC,<br>(sector slip) |
| Disk type              | 32301                                  | 32302                      | 32304                 | 32305                       |
| Format command         | (none)                                 | (none)                     | (none)                | (none)                      |
| Diagnostic tracks      | no                                     | no                         | no                    | no                          |
| Bad spot strategy      | SPOT                                   | SPOT                       | SPOT                  | SPOT                        |
| Max. no. of bad spots  | 144                                    | 144                        | 270                   | 270                         |
| Number of sectors      | 627264                                 | 609840                     | 1523880               | 1481550                     |
| Sector size (in bytes) | 512                                    | 512                        | 512                   | 512                         |
| Sectors per track      | 36                                     | 35                         | 36                    | 35                          |
| Cylinders              | 968                                    | 968                        | 1411                  | 1411                        |
| Heads                  | 9                                      | 9                          | 15                    | 15                          |
| Precomp. cylinder      | 0                                      | 0                          | 0                     | 0                           |
| Sector interleave      | 1                                      | 1                          | 1                     | 1                           |
| Spiral offset          | 22                                     | 22                         | 22                    | 22                          |
| Step rate              | 0                                      | 0                          | 0                     | 0                           |
| Starting head number   | 0                                      | 0                          | 0                     | 0                           |
| ECC error length       | 0                                      | 0                          | 0                     | 0                           |
| Attributes mask (hex)  | 0                                      | 0                          | 0                     | 0                           |
| Ext. attr. mask (hex)  | 0                                      | 0                          | 0                     | 0                           |
| Attributes word (hex)  | 10                                     | 10                         | 10                    | 10                          |
| Ext. attr. word (hex)  | 0                                      | 0                          | 0                     | 0                           |
| Gap byte 1 (hex)       | a                                      | a                          | a                     | a                           |
| Gap byte 2 (hex)       | a                                      | a                          | a                     | a                           |
| Gap byte 3 (hex)       | 0                                      | 0                          | 0                     | 0                           |
| Gap byte 4 (hex)       | 0                                      | 0                          | 0                     | 0                           |
| Controller attr. (hex) | 20                                     | 60                         | 20                    | 60                          |
| Unform. sector size    | 580                                    | 580                        | 580                   | 580                         |
| Sector slip count      | 0                                      | 1                          | 0                     | 1                           |
| Slice count            | 8                                      | 8                          | 8                     | 8                           |
| Root fileys offset     | 324                                    | 315                        | 540                   | 525                         |
| Root fileys size R3V5  | 29160                                  | 28350                      | 29700                 | 28875                       |
| R3V6                   | 60000                                  | 60000                      | 60000                 | 60000                       |
| /usr fileys size R3V5  | 106920                                 | 103950                     | 108000                | 105000                      |
| R3V6                   | 180000                                 | 180000                     | 180000                | 180000                      |
| /usr filesystem slice  | 2                                      | 2                          | 2                     | 2                           |
| Swap size R3V5         | 29160                                  | 28350                      | 29700                 | 28875                       |
| R3V6                   | 40000                                  | 40000                      | 40000                 | 40000                       |
| Swap slice             | 1                                      | 1                          | 1                     | 1                           |
| End-of-disk res. area  | 5184                                   | 5040                       | 9720                  | 9450                        |
| Alternates list        | (144) 8568-8711                        | (144) 8568-8711            | (270) 20896-21165     | (270) 20896-21165           |
| read bad list cmd      | /etc/m323rd -1 no. of cyl no. of heads |                            | max. no. of bad spots | /tmp /xyz123                |

### 18.1.3.4 Disk Definitions for the MVME327A

|                         | m327sea40      | m327sea80      | m327cdclll     | m327cdclV  |
|-------------------------|----------------|----------------|----------------|------------|
| Comment                 | Seagate ST157N | Seagate ST296N | WREN III 155Mb | WREN 300Mb |
| Disk type               | 5122           | 3842           | 4098           | 4866       |
| Format command          | (none)         | (none)         | (none)         | (none)     |
| Diagnostic tracks       | no             | no             | no             | no         |
| Bad spot strategy       | PERFECT        | PERFECT        | PERFECT        | PERFECT    |
| Max. no. of bad spots   | 100            | 0              | 0              | 0          |
| Number of sectors       | 94859          | 165850         | 304605         | 597699     |
| Sector size (in bytes)  | 512            | 512            | 512            | 512        |
| Sectors per track       | 26             | 34             | 35             | 47         |
| Cylinders               | 608            | 812            | 967            | 1413       |
| Heads                   | 6              | 6              | 9              | 9          |
| Precomp. cylinder       | 608            | 812            | 967            | 1413       |
| Sector interleave       | 3              | 3              | 0              | 0          |
| Spiral offset           | 0              | 0              | 0              | 0          |
| Step rate               | 0              | 0              | 0              | 0          |
| Starting head number    | 0              | 0              | 0              | 0          |
| ECC error length        | 0              | 0              | 0              | 0          |
| Attributes mask (hex)   | 10             | 10             | 10             | 10         |
| Ext. attr. mask (hex)   | 0              | 0              | 0              | 0          |
| Attributes word (hex)   | 10             | 10             | 10             | 10         |
| Ext. attr. word (hex)   | 0              | 0              | 0              | 0          |
| Gap byte 1 (hex)        | 0              | 0              | 0              | 0          |
| Gap byte 2 (hex)        | 0              | 0              | 0              | 0          |
| Gap byte 3 (hex)        | 0              | 0              | 0              | 0          |
| Gap byte 4 (hex)        | 0              | 0              | 0              | 0          |
| Controller attr. (hex)  | 850            | 850            | 1              | 850        |
| Unform. sector size     | 0              | 0              | 0              | 0          |
| Sector slip count       | 0              | 0              | 1              | 1          |
| Slice count             | 8              | 8              | 8              | 8          |
| Root filesys offset     | 324            | 324            | 324            | 324        |
| Root filesyst size R3V5 | 29160          | 29160          | 29160          | 20160      |
| R3V6                    | 29160          | 32648          | 60000          | 60000      |
| /usr filesyst size R3V5 | 35880          | 106680         | 106920         | 106920     |
| R3V6                    | 35880          | 116352         | 180000         | 180000     |
| /usr filesystem slice   | 2              | 2              | 2              | 2          |
| Swap size R3V5          | 29160          | 29160          | 29160          | 29160      |
| R3V6                    | 29160          | 16000          | 40000          | 40000      |
| Swap slice              | 1              | 1              | 1              | 1          |
| End-of-disk res. area   | 0              | 0              | 0              | 0          |
| Alternates list         | (1) 1          | (3) 1-3        | (0)            | (1) 1      |
| read bad list cmd       | (none)         | (none)         | (none)         | (none)     |

# Disk Definitions for the MVME327A (continued)

|                        | m327cdcV                   | m327cdcVII     | m327dsdd5    | m327pcat           |
|------------------------|----------------------------|----------------|--------------|--------------------|
| Comment                | WREN V 600Mb               | WREN VII 1.2Gb | 655Kb Floppy | 1.2Mb PC/AT Floppy |
| Disk type              | 4866                       | 4866           | 1            | 1                  |
| Format command         | (none)                     | (none)         | (none)       | (none)             |
| Diagnostic tracks      | no                         | no             | no           | no                 |
| Bad spot strategy      | PERFECT                    | PERFECT        | PERFECT      | PERFECT            |
| Max. no. of bad spots  | 100                        | 100            | 0            | 0                  |
| Number of sectors      | 1195740                    | 3997170        | 2560         | 4800               |
| Sector size (in bytes) | 512                        | 512            | 256          | 512                |
| Sectors per track      | 52                         | 69             |              | 15                 |
| Cylinders              | 1533                       | 1931           | 80           | 80                 |
| Heads                  | 15                         | 15             | 2            | 2                  |
| Precomp. cylinder      | 1533                       | 1931           | 40           | 40                 |
| Sector interleave      | 1                          | 1              | 0            | 0                  |
| Spiral offset          | 0                          | 0              | 0            | 0                  |
| Step rate              | 0                          | 0              | 20           | 20                 |
| Starting head number   | 0                          | 0              | 0            | 0                  |
| ECC error length       | 0                          | 0              | 0            | 0                  |
| Attributes mask (hex)  | 10                         | 10             | 0            | 0                  |
| Ext. attr. mask (hex)  | 0                          | 0              | 0            | 0                  |
| Attributes word (hex)  | 10                         | 10             | 4f           | 226f               |
| Ext. attr. word (hex)  | 0                          | 0              | 0            | 0                  |
| Gap byte 1 (hex)       | 0                          | 0              | 0            | 0                  |
| Gap byte 2 (hex)       | 0                          | 0              | 0            | 0                  |
| Gap byte 3 (hex)       | 0                          | 0              | 0            | 0                  |
| Gap byte 4 (hex)       | 0                          | 0              | 0            | 0                  |
| Controller attr. (hex) | 850                        | 150            | 0            | 0                  |
| Unform. sector size    | 0                          | 0              | 0            | 0                  |
| Sector slip count      | 1                          | 1              | 0            | 0                  |
| Slice count            | 8                          | 8              | 0            | 0                  |
| Root filesys offset    | 324                        | 324            | 6            | 15                 |
| Root filesys size      | R3V5 29160<br>R3V6 60000   | -<br>100000    | 0<br>0       | 0<br>0             |
| /usr filesys size      | R3V5 106920<br>R3V6 180000 | -<br>250000    | 0<br>0       | 0<br>0             |
| /usr filesystem slice  | 2                          | 2              | 0            | 0                  |
| Swap size              | R3V5 29160<br>R3V6 40000   | -<br>50000     | 0<br>0       | 0<br>0             |
| Swap slice             | 1                          | 1              | 0            | 0                  |
| End-of-disk res. area  | 0                          | 0              | 0            | 0                  |
| Alternates list        | (1) 1                      | (1) 1          | (0)          | (0)                |
| read bad list cmd      | (none)                     | (none)         | (none)       | (none)             |



### 18.1.3.5 Disk Definitions for the MVME328

|                        | m328cdcIII                       | m328cdcIV                       | m328cdcV                       | m328cdcVII                       |
|------------------------|----------------------------------|---------------------------------|--------------------------------|----------------------------------|
| Comment                | CDC WREN III<br>155Mb SCSI drive | CDC WREN IV<br>300Mb SCSI drive | CDC WREN V<br>600Mb SCSI drive | CDC WREN VII<br>1.2Gb SCSI drive |
| Disk type              | 4098                             | 4866                            | 4866                           | 4866                             |
| Format command         | (none)                           | (none)                          | (none)                         | (none)                           |
| Diagnostic tracks      | no                               | no                              | no                             | no                               |
| Bad spot strategy      | PERFECT                          | PERFECT                         | PERFECT                        | PERFECT                          |
| Max. no. of bad spots  | 100                              | 100                             | 100                            | 100                              |
| Number of sectors      | 304605                           | 597699                          | 1195740                        | 1998585                          |
| Sector size (in bytes) | 512                              | 512                             | 512                            | 512                              |
| Sectors per track      | 35                               | 47                              | 52                             | 69                               |
| Cylinders              | 967                              | 1413                            | 1533                           | 1931                             |
| Heads                  | 6                                | 9                               | 15                             | 15                               |
| Precomp. cylinder      | 608                              | 1413                            | 1533                           | 1931                             |
| Sector interleave      | 0                                | 0                               | 1                              | 1                                |
| Spiral offset          | 0                                | 0                               | 0                              | 0                                |
| Step rate              | 0                                | 0                               | 0                              | 0                                |
| Starting head number   | 0                                | 0                               | 0                              | 0                                |
| ECC error length       | 0                                | 0                               | 0                              | 0                                |
| Attributes mask (hex)  | 10                               | 10                              | 10                             | 10                               |
| Ext. attr. mask (hex)  | 0                                | 0                               | 0                              | 0                                |
| Attributes word (hex)  | 10                               | 10                              | 10                             | 10                               |
| Ext. attr. word (hex)  | 0                                | 0                               | 0                              | 0                                |
| Gap byte 1 (hex)       | 0                                | 0                               | 0                              | 0                                |
| Gap byte 2 (hex)       | 0                                | 0                               | 0                              | 0                                |
| Gap byte 3 (hex)       | 0                                | 0                               | 0                              | 0                                |
| Gap byte 4 (hex)       | 0                                | 0                               | 0                              | 0                                |
| Controller attr. (hex) | 850                              | 850                             | 850                            | 150                              |
| Uniform. sector size   | 0                                | 0                               | 0                              | 0                                |
| Sector slip count      | 0                                | 0                               | 1                              | 1                                |
| Slice count            | 8                                | 8                               | 8                              | 8                                |
| Root filesys offset    | 324                              | 324                             | 324                            | 324                              |
| Root filesyst size     | 60000                            | 60000                           | 60000                          | 60000                            |
| /usr filesyst size     | 203957                           | 457051                          | 457051                         | 457051                           |
| /usr filesystem slice  | 2                                | 2                               | 2                              | 2                                |
| Swap size              | 40000                            | 80000                           | 256002                         | 512002                           |
| Swap slice             | 1                                | 1                               | 1                              | 1                                |
| End-of-disk res. area  | 0                                | 0                               | 0                              | 0                                |
| Alternates list        | (0)                              | (1) 1                           | (1) 1                          | (1) 1                            |
| read bad list cmd      | (none)                           | (none)                          | (none)                         | (none)                           |



# Disk Definitions for the MVME328 (continued)

|                        | m328dsdd5                                | m328pcat               | m328pcxt8              | m328pcxt9              |
|------------------------|------------------------------------------|------------------------|------------------------|------------------------|
| Comment                | 5.25" double sided double density floppy | 1.2Mb IBM PC/AT floppy | 320kb IBM PC/XT floppy | 320kb IBM PC/XT floppy |
| Disk type              | 1                                        | 1                      | 3840                   | 3840                   |
| Format command         | (none)                                   | (none)                 | (none)                 | (none)                 |
| Diagnostic tracks      | no                                       | no                     | no                     | no                     |
| Bad spot strategy      | PERFECT                                  | PERFECT                | PERFECT                | PERFECT                |
| Max. no. of bad spots  | 0                                        | 0                      | 0                      | 0                      |
| Number of sectors      | 1276                                     | 2400                   | 640                    | 720                    |
| Sector size (in bytes) | 256                                      | 512                    | 512                    | 512                    |
| Sectors per track      | 16                                       | 15                     | 8                      | 9                      |
| Cylinders              | 80                                       | 80                     | 40                     | 40                     |
| Heads                  | 2                                        | 2                      | 2                      | 2                      |
| Precomp. cylinder      | 40                                       | 40                     | 40                     | 40                     |
| Sector interleave      | 0                                        | 0                      | 0                      | 0                      |
| Spiral offset          | 0                                        | 0                      | 0                      | 0                      |
| Step rate              | 20                                       | 20                     | 100                    | 0                      |
| Starting head number   | 0                                        | 0                      | 0                      | 0                      |
| ECC error length       | 0                                        | 0                      | 0                      | 0                      |
| Attributes mask (hex)  | 0                                        | 0                      | 0                      | 0                      |
| Ext. attr. mask (hex)  | 0                                        | 0                      | 0                      | 0                      |
| Attributes word (hex)  | 0                                        | 0                      | 0                      | 0                      |
| Ext. attr. word (hex)  | 0                                        | 0                      | 0                      | 0                      |
| Gap byte 1 (hex)       | 0                                        | 0                      | 0                      | 0                      |
| Gap byte 2 (hex)       | 0                                        | 0                      | 0                      | 0                      |
| Gap byte 3 (hex)       | 0                                        | 0                      | 0                      | 0                      |
| Gap byte 4 (hex)       | 0                                        | 0                      | 0                      | 0                      |
| Controller attr. (hex) | 0                                        | 0                      | 0                      | 0                      |
| Uniform. sector size   | 0                                        | 0                      | 0                      | 0                      |
| Sector slip count      | 0                                        | 0                      | 0                      | 0                      |
| Slice count            | 0                                        | 0                      | 0                      | 0                      |
| Root filesys offset    | 6                                        | 15                     | 6                      | 6                      |
| Root filesys size      | 0                                        | 0                      | 0                      | 0                      |
| usr filesys size       | 0                                        | 0                      | 0                      | 0                      |
| usr filesystem slice   | 0                                        | 0                      | 0                      | 0                      |
| Swap size              | 0                                        | 0                      | 0                      | 0                      |
| Swap slice             | 0                                        | 0                      | 0                      | 0                      |
| End-of-disk res. area  | 0                                        | 0                      | 0                      | 0                      |
| Alternates list        | (0)                                      | (0)                    | (0)                    | (0)                    |
| read bad list cmd      | (none)                                   | (none)                 | (none)                 | (none)                 |

## 18.2 MVME831/832/831XT/832XT and MVME883TEAC TEAC FD-55 drives

The MVME83x and MVME883 are 5.25" flexible disk drives:

|           |                  |                                                                                                                         |
|-----------|------------------|-------------------------------------------------------------------------------------------------------------------------|
| MVME831   | TEAC FD-55FV     | First 653Kbyte flexible disk drive on the MVME320A/B                                                                    |
| MVME832   | TEAC FD-55FV     | This drive is End Commercial Delivery<br>Second 653Kbyte flexible disk drive on the MVME320A/B. End Commercial Delivery |
| MVME831XT | TEAC FD-55GFV17U | First 1.2Mbyte flexible disk drive on the MVME320B                                                                      |
| MVME832XT | TEAC FD-55GFV17U | Second 1.2Mbyte flexible disk drive on the MVME320B. End Commercial Delivery                                            |
| MVME883   | TEAC FD-55GFV17U | 1.2Mbyte flexible disk drive on the MVME327A                                                                            |

### 18.2.1 Characteristics

For the technical data and the default disk templates, see section 18.1.

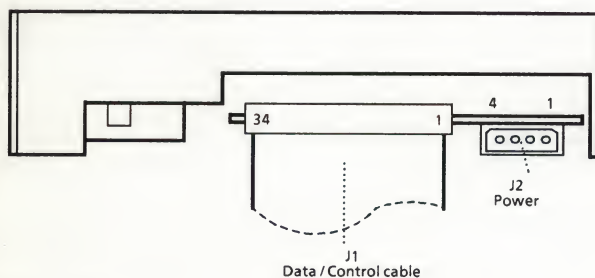
### 18.2.2 Connections

For connection of a FDD with a SA-400 interface to:

MVME320A, see section 12.2.2

MVME320B, see section 12.3.3

MVME327A, see section 12.5.2.



| J3 - Power |              |
|------------|--------------|
| 1          | + 12V        |
| 2          | + 12V Return |
| 3          | + 5V Return  |
| 4          | + 5V         |

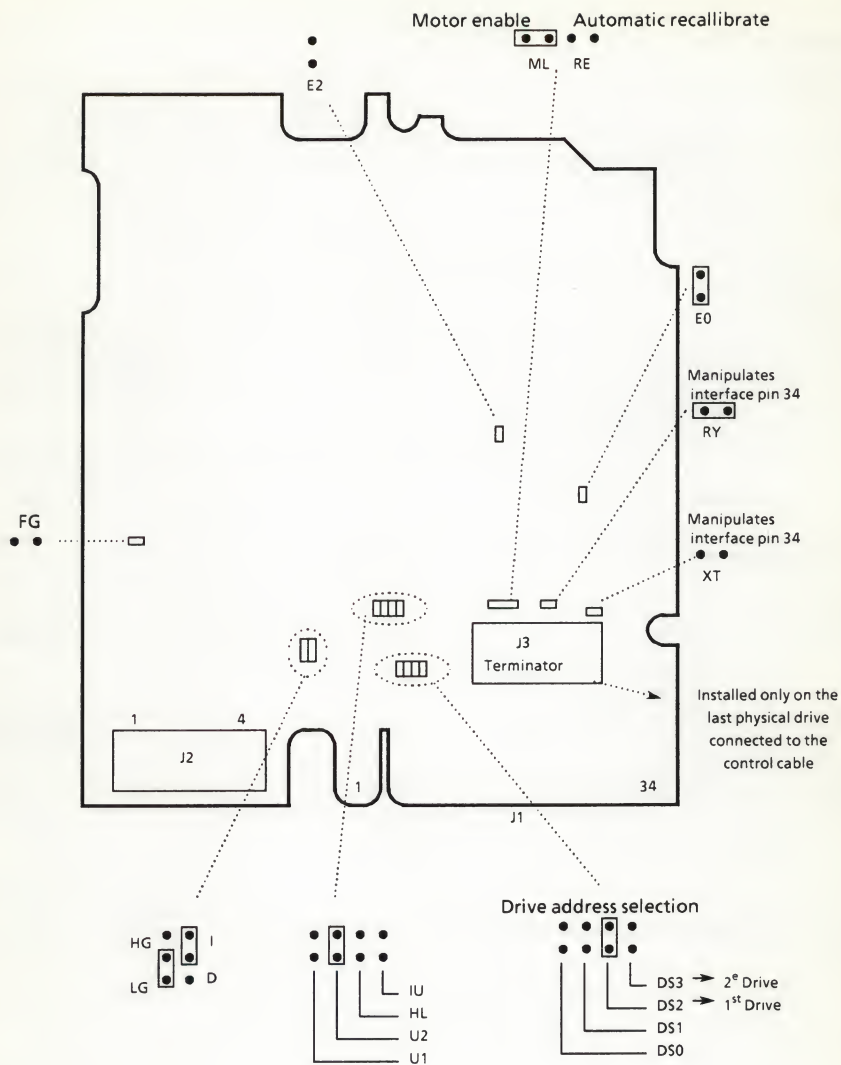
## 18.2.3 Strap Setting

### 18.2.3.1 MVME831/832TEAC FD-55FV

#### STRAPS

| STRAP | FUNCTION                                                                 | SETTING                 | REMARKS                                                                   |
|-------|--------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------|
| DS0   | Drive address selection.                                                 | No strap.               | Only one DS strap is set.                                                 |
| DS1   | See DS0.                                                                 | No strap.               | See above.                                                                |
| DS2   | See DS0.                                                                 | Strapped for drive 0, 2 | See above.                                                                |
| DS3   | See DS0.                                                                 | Strapped for drive 0, 3 | See above.                                                                |
| FG    | Connect logical ground to protective ground.                             | No strap.               | Not connected.                                                            |
| U1    | Selection for the function of the indicator on the front panel.          | No strap.               |                                                                           |
| U2    | Selection for the function of the indicator on the front panel.          | Strapped.               | Indicator is on, when Drive is selected and Drive is Ready.               |
| HL    | -                                                                        | No strap.               | -                                                                         |
| IU    | Enable the IN USE signal.                                                | No strap.               | Disabled.                                                                 |
| ML    | Selects spindle motor rotation conditions.                               | No strap.               | Spindle motor rotates only by MOTOR ON input signal active.               |
| RE    | Automatic Recalibrate                                                    | No strap.               | Disabled.                                                                 |
| RY    | Manipulates interface pin 34                                             | Strapped.               | Ready output at interface signal 34.                                      |
| XT    | Manipulates interface pin 34                                             | No strap.               |                                                                           |
| E0    | Selects output conditions for the INDEX/SECTOR and the DATA READ pulses. | Strapped.               | Factory set.                                                              |
| E2    | Selects output conditions for the INDEX/SECTOR and the DATA READ pulses. | No strap.               | Factory set.                                                              |
| J3    | Termination Resistor package                                             |                         | Installed only on the last physical drive connected to the control cable. |

For the front panel LED, see strap setting for the U1 and U2 for LED ON conditions.



Terminating resistors MVME831 / 832

|                   |                        |
|-------------------|------------------------|
| Type              | RAD-4E-3317 J (7x330Ω) |
| Nr. of pins       | 14 (DIP)               |
| Nr. of RNW/Device | 1                      |



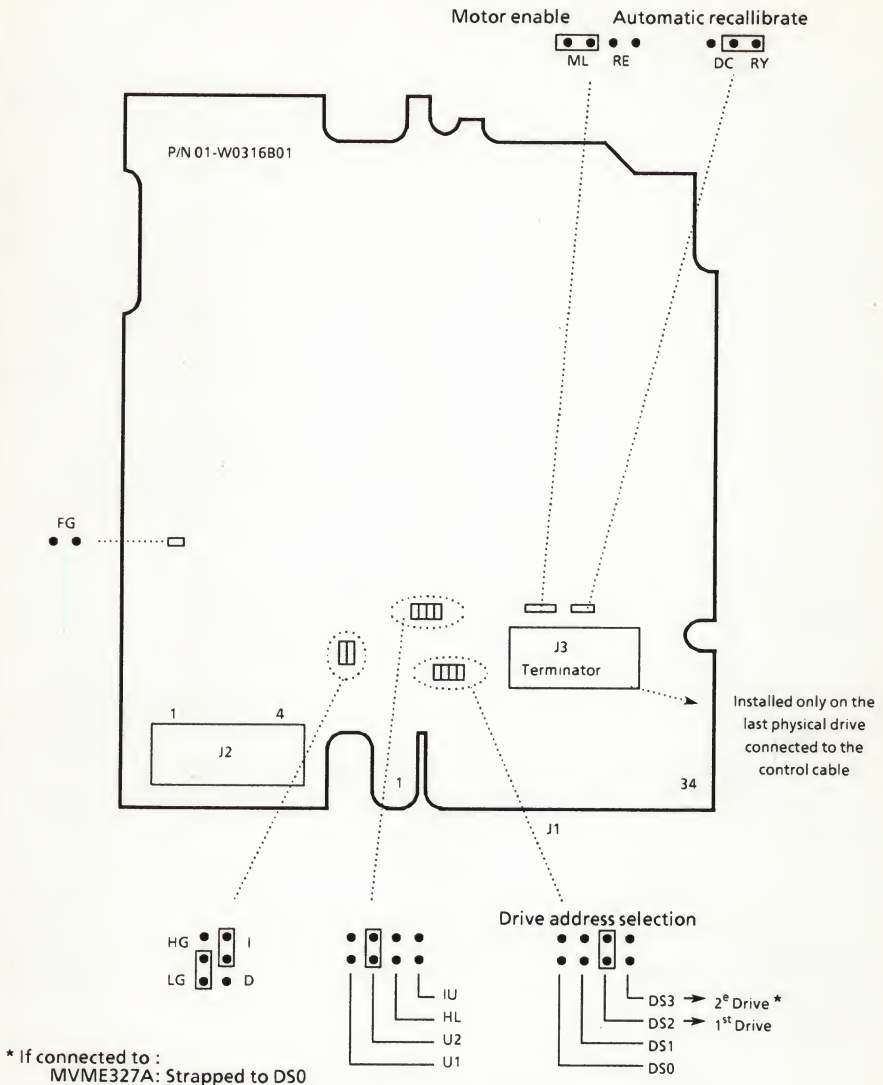
### 18.2.3.2 MVME831XT/832XT TEAC FD-55GVF17U

#### STRAPS

| STRAP | FUNCTION                                                        | SETTING                 | REMARKS                                                                   |
|-------|-----------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------|
| DS0   | Drive address selection.                                        | No strap.               | Only one DS strap is set.                                                 |
| DS1   | See DS0.                                                        | No strap.               | See above.                                                                |
| DS2   | See DS0.                                                        | Strapped for drive 0, 2 | See above.                                                                |
| DS3   | See DS0.                                                        | Strapped for drive 0, 3 | See above.                                                                |
| FG    | Connect logical ground to protective ground.                    | No strap.               | Not connected.                                                            |
| U1    | Selection for the function of the indicator on the front panel. | No strap.               |                                                                           |
| U2    | Selection for the function of the indicator on the front panel. | Strapped.               | Indicator is on, when Drive is selected and Drive is Ready.               |
| HL    | Enable the HEAD LOAD signal                                     | No strap.               | Disabled.                                                                 |
| IU    | Enable the IN USE signal.                                       | No strap.               | Disabled.                                                                 |
| ML    | Motor enable.                                                   | Strapped.               | Motor starts when LED comes on.                                           |
| RE    | Automatic Recalibrate                                           | No strap.               | Disabled.                                                                 |
| DC/RV | Disc Change or Ready output at interface signal 34.             | Strap on RV.            | Ready output at interface signal 34.                                      |
| HG/LG | Select high or low density.                                     | Strap on LG.            | Low density select.                                                       |
| I/D   | Interface Density select                                        | Strap on I.             | External.                                                                 |
| J3    | Termination Resistor package                                    |                         | Installed only on the last physical drive connected to the control cable. |

For the front panel LED, see strap setting for the U1 and U2 for LED ON conditions.

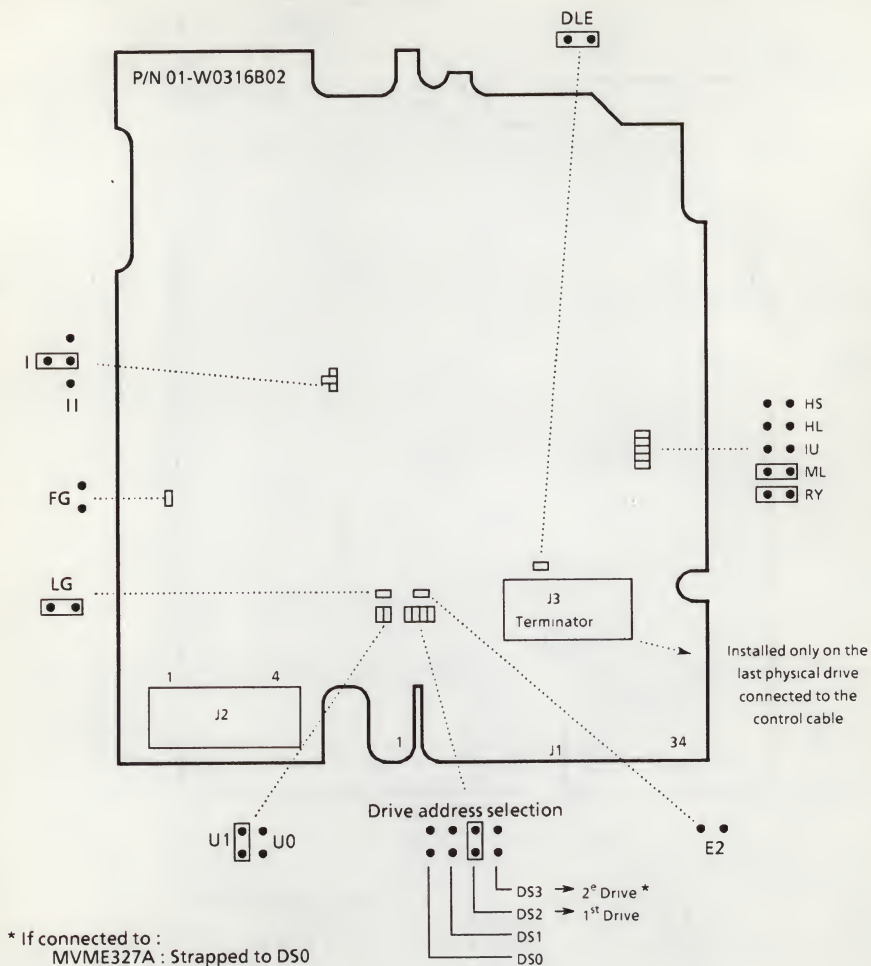
Strap Setting for Type P/N 01-W0316B01



Terminating resistors MVME831XT / 832XT / 883

|                   |                        |
|-------------------|------------------------|
| Type              | RAD-4E-3318 J (8x330Ω) |
| Nr. of pins       | 16 (DIP)               |
| Nr. of RNW/Device | 1                      |

# Strap setting for Type P/N 01-W0316B02



Terminating resistors MVME831XT / 832XT / 883

|                   |                        |
|-------------------|------------------------|
| Type              | RAD-4E-3318 J (8x330Ω) |
| Nr. of pins       | 16 (DIP)               |
| Nr. of RNW/DEVICE | 1                      |

## **18.2.4 Installation**

For the installation and positioning rules, see chapter 2.

When using a new diskette it should be initialized (formatted) and if necessary, file system(s) should be created. This is in principle the responsibility of the system administrator, the customer.

For an example how to initialize the diskette and how to create file systems, see chapter 1.

## **18.2.5 Maintenance**

The flexible disk drives can also be tested using the processor debugger and diagnostics, the drive can also be tested via the SSID tests.

### **Preventive Maintenance**

The drive requires normally no preventive maintenance, only cleaning of the read/write heads is necessary.

Head cleaning may be necessary. Use cleaning kit S/CP 04, 12 NC 8709 004 10411.

### **Corrective Maintenance:**

For the corrective maintenance, see chapter 3.10.





### 18.3 MVME831XT/832XT/881/883 TEAC FD-55GFR 606-U

The TEAC FD-55GFR-6060U is known under the following MVME names:

|           |                                           |                         |
|-----------|-------------------------------------------|-------------------------|
| MVME831XT | First FDD on the MVME320B                 | End Commercial Delivery |
| MVME832XT | Second FDD on the MVME320B                | End Commercial Delivery |
| MVME881   | FDD drive with the OMTI 7000 SCSI adapter | End Commercial Delivery |
| MVME883   | FDD used on the MVME327A                  |                         |

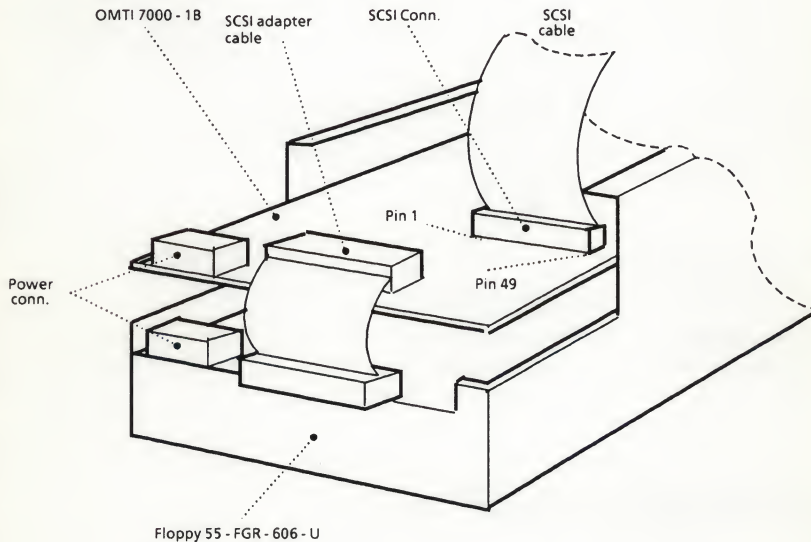
#### 18.3.1 Characteristics

For the technical data and the default disk templates, see section 18.1.

#### 18.3.2 Connections

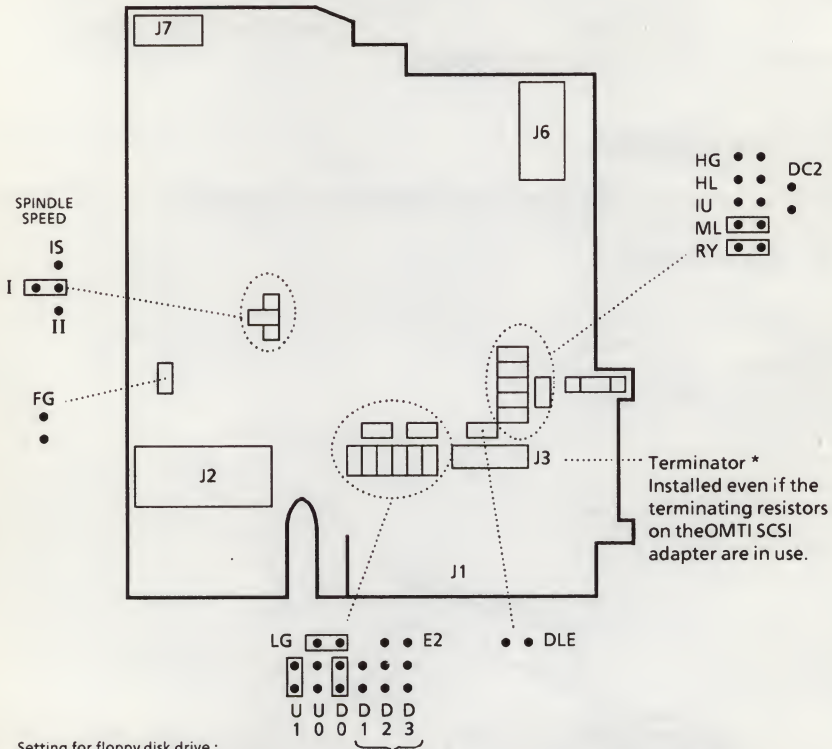
For connection of a FDD with SA400-interface to:

|          |                             |
|----------|-----------------------------|
| MVME147  | See section 9.6.2, or 9.7.2 |
| MVME320B | See section 12.3.3.         |
| MVME327A | See section 12.5.2.         |



### 18.3.3 Strap Setting

**NOTE:** In case SCSI adapter is in use, remove first this adapter to check the strapsetting of Floppy Disk.



Setting for floppy disk drive :

- Connected to MVME320B : 1<sup>st</sup> Drive → D2 strapped  
2<sup>nd</sup> Drive → D3 strapped
- Connected to any MVME147 : 1<sup>st</sup> Drive → D0 strapped
- Connected to MVME327A : 1<sup>st</sup> Drive → D0 strapped

Terminating resistors MVME831XT / 832XT / 883

|                   |                       |
|-------------------|-----------------------|
| TYPE              | RAD-4E-3318 J 8x330 Ω |
| Nr. of pins       | 16 (DIP)              |
| Nr. of RNW/Device | 1 *                   |

### **18.3.4 Installation**

For the installation and positionings rules, see chapter 2.

When using a new diskette it should be initialized (formatted) and, if necessary, file system(s) should be created. This is the responsibility of the system administrator, the customer.

For an example, see chapter 1.

### **18.3.5 Maintenance**

#### **Test and Diagnostics**

The Flexible Disk Drives TEAC FD-556FR-606-U can be tested using the processor debugger and diagnostics. Also the SSID can be used.

#### **Preventive Maintenance**

The drive requires normally no preventive maintenance.

Head cleaning may be necessary. Use cleaning kit S/CP 04. (8709 004 10411).

#### **Corrective Maintenance**

See chapter 3.10.

The MVME831XT/832XT/883 is a Field Replaceable Unit.





## 18.4 OMTI 7000 SCSI adapter

The OMTI 7000-1B is the SCSI adapter for the 1.2Mbyte flexible disk drives Teac FD-55GFR 606-U

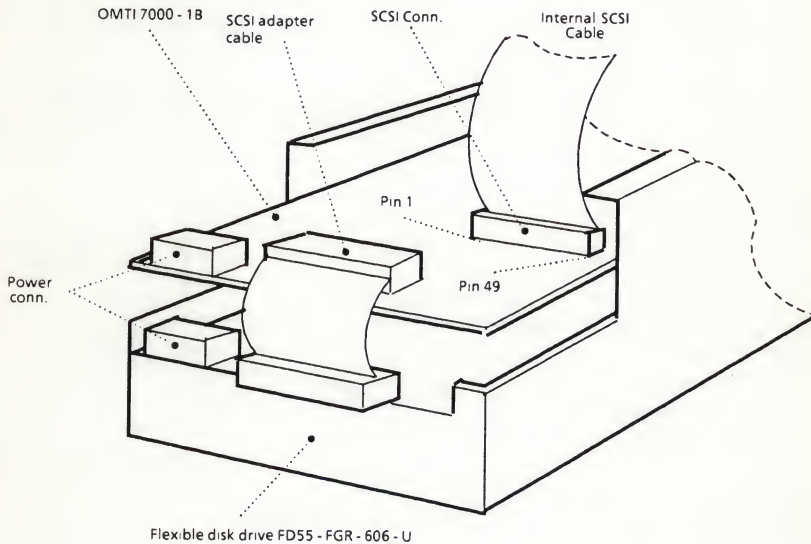
The combination Teac FDD and OMTI SCSI adapter is known under the name MVME881 which only can be used on the MVME147 as SCSI drive number 6.

The MVME881 is End Commercial Delivery.

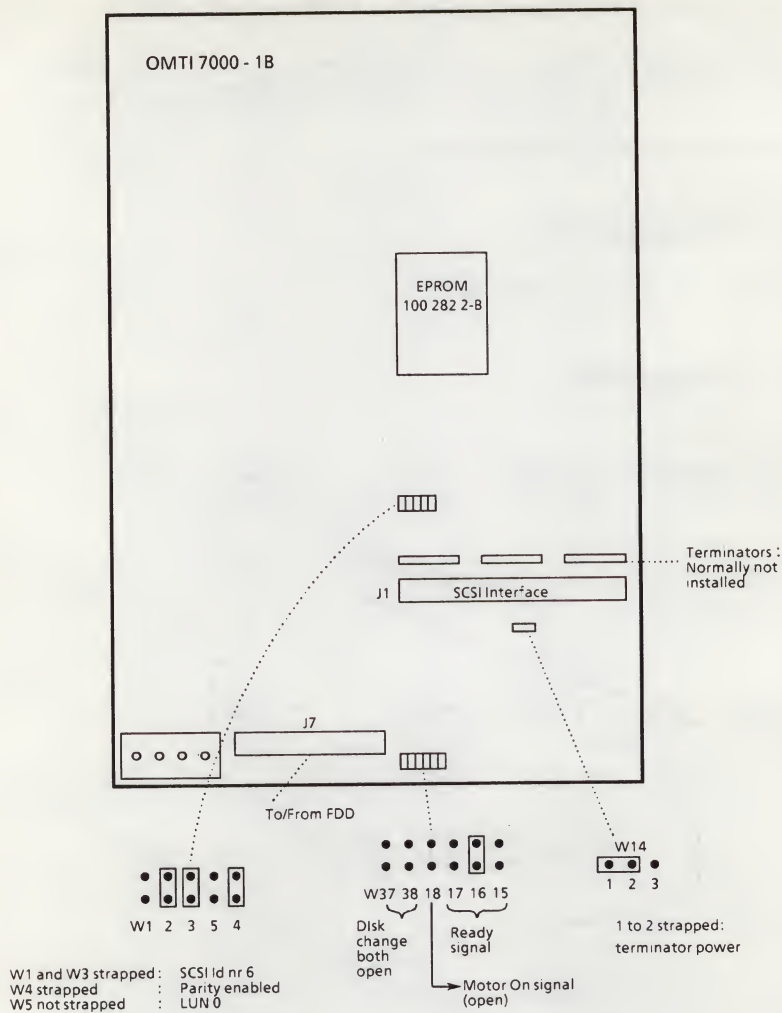
### 18.4.1 Characteristics

For the technical data see section 18.1.

### 18.4.2 Connections



### 18.4.3 Strap Setting



\* Terminating resistors MVME881

|                   |                         |
|-------------------|-------------------------|
| Type              | 8x-4-221/331 (220/330Ω) |
| Nr. of pins       | 8 (SIP)                 |
| Nr. of RNW/Device | 3                       |

#### **18.4.4 Installation**

When installing the OMTI 7000 SCSI adapter, the FDD connected to the SCSI adapter must be strapped as the first drive because it is the first and only drive connected to the SCSI adapter.

##### **Removal**

The SCSI adapter is mounted below the FDD in its own metal housing. To remove the SCSI adapter, remove the FDD with SCSI adapter from the cabinet, see chapter 4. Then remove the cables to the SCSI adapter and remove it from the housing by pushing it off from the four PCB holders.

#### **18.4.5 Maintenance**

##### **Test and Diagnostics**

The MVME881 can be tested using the processor debugger and diagnostics. There are no separate tests for the OMTI 7000 SCSI adapter.

The MVME881 can also be tested via the SSID.

##### **Preventive Maintenance**

The drive requires normally no preventive maintenance, except for the periodic head cleaning. Head cleaning may be necessary, use cleaning kit S/CP 04. (8709 004 10411).

##### **Corrective Maintenance**

The SCSI adapter (as part of the MVME881) is a Field Replaceable Unit.





## 18.5 MVME841 Micropolis 1325

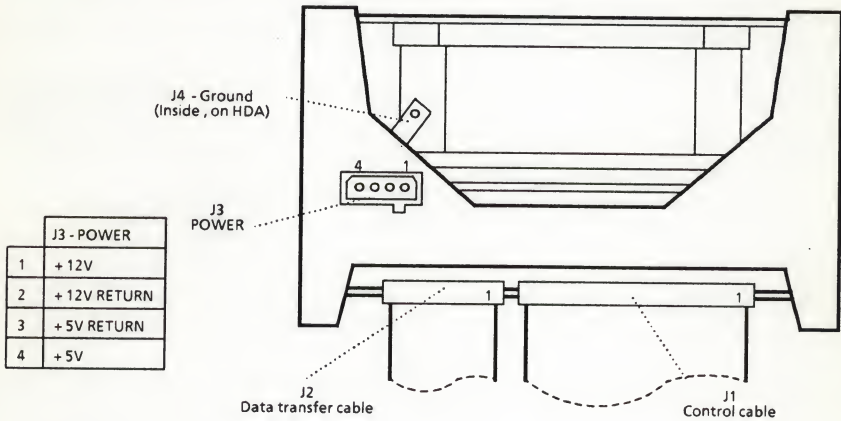
The MVME841 is End Commercial Delivery

### 18.5.1 Characteristics

For the technical data and the disk templates see section 18.1.

### 18.5.2 Connections

For connection to a MVME320A/B, see 12.2.2 or 13.3.3.



### 18.5.3 Strap Settings

The straps can be accessed easier if the electronics board of the drive is set in the service position. This can be done as follows, loosen the two screws at the connector side and turn the board at this side upward, see next page.

#### STRAPS

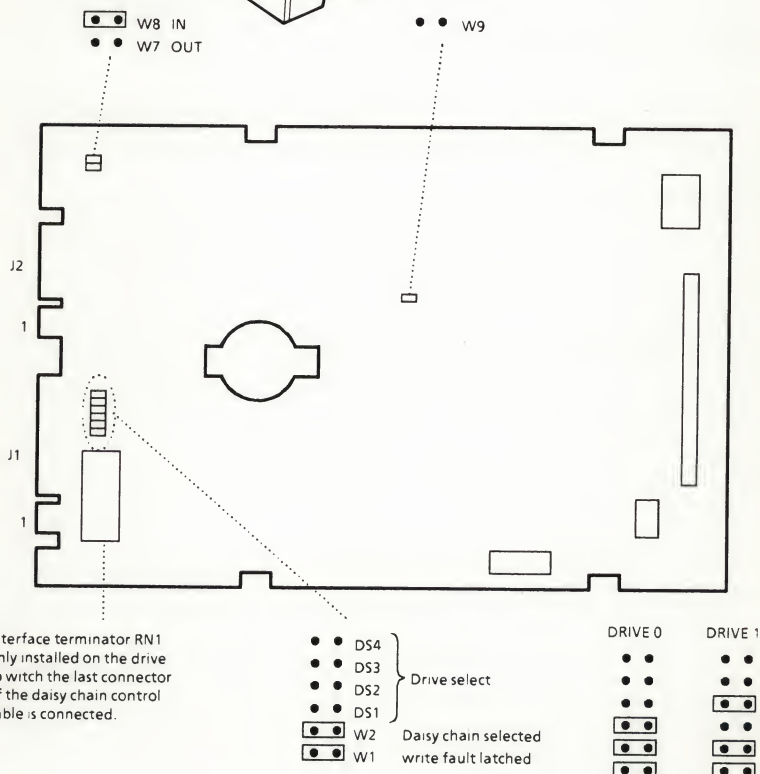
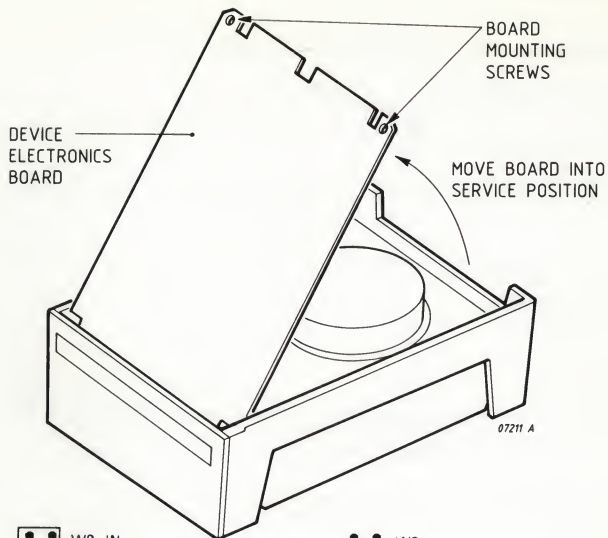
| STRAP | FUNCTION                                                      | SETTING                | REMARKS                                                                                                |
|-------|---------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------|
| W1    | Write Fault Latched, yes or no.                               | Strapped               | Write Fault Latched.                                                                                   |
| W2    | Daisy Chain or Radial Select.                                 | Strapped               | Daisy Chain selected.                                                                                  |
| DS1   | Drive select 1,2,3 or 4. Only one DS strap is set at a drive. | Strapped for drive 0,0 | Selects first drive of a controller.                                                                   |
| DS2   | See DS1.                                                      | Strapped for drive 0,1 | Selects second drive of a controller.                                                                  |
| DS3   | See DS1                                                       | No strap.              | No third drive connected to a controller.                                                              |
| DS4   | See DS1                                                       | No strap.              | No fourth drive connected to a controller.                                                             |
| W7    | -                                                             | No strap.              | -                                                                                                      |
| W8    | -                                                             | Strapped               | -                                                                                                      |
| W9    | -                                                             | No strap.              | -                                                                                                      |
| RN1   | Terminating Resistor package *                                | Can be installed.      | Only installed on the drive to witch the last connector of the daisy chain control cable is connected. |

#### LEDs

|     | FUNCTION                                   | REMARKS                                   |
|-----|--------------------------------------------|-------------------------------------------|
| LED | This LED is lit when the drive is selected | Can only be seen if the cover is removed. |

\* TERMINATING RESISTORS MVME841

|                   |                            |
|-------------------|----------------------------|
| TYPE              | CTS8625 770 105 (220/330Ω) |
| Nr. OF PINS       | 10 (DIP)                   |
| Nr. OF RNW/DEVICE | 1                          |





## **18.5.4 Installation**

For the installation and positioning rules see chapter 2

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is in principle the responsibility of the system administrator, the customer.

For an example, how to initialize the disk drive and how to create file systems, see chapter 1.

## **18.5.5 Maintenance**

### **Tests and Diagnostics**

The MVME841 disk drive can be tested using the processor debugger and diagnostics, the drive can also be tested via the SSID tests.

The drive does not requires any preventive maintenance.

For the corrective maintenance, see chapter 3.

## 18.6 MVME842 CDC WREN III

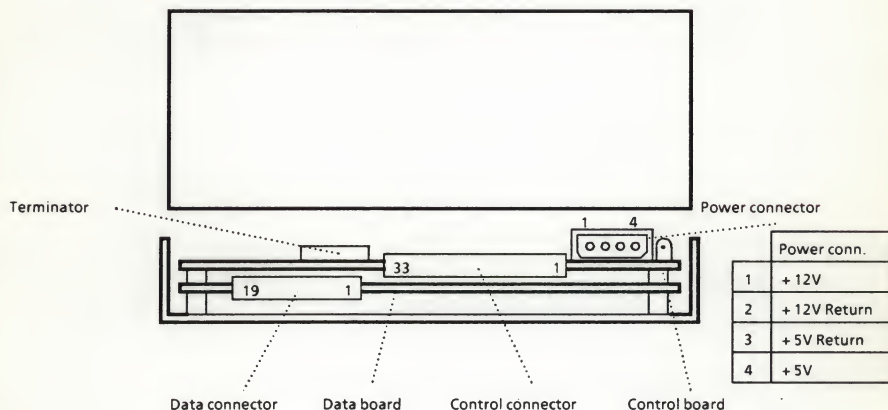
The MVME842 is End Commercial Delivery

### 18.6.1 Characteristics

For the technical data and default disk template, see section 18.1.

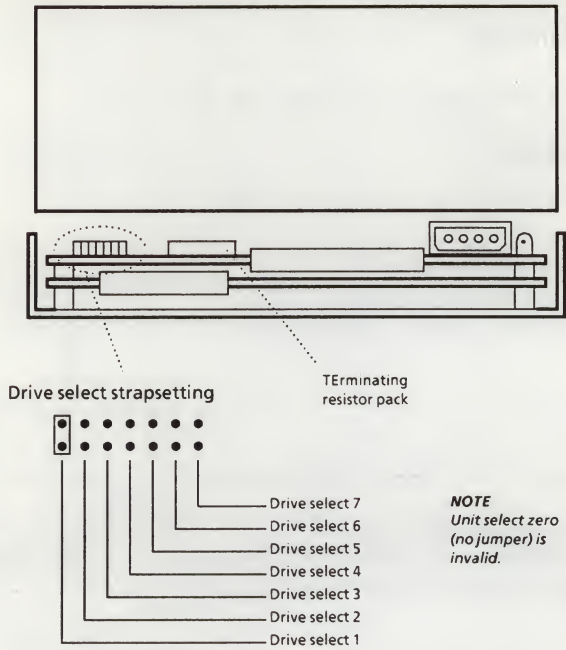
### 18.6.2 Connections

For connections to the MVME323, see section 12.4.2.



18.6.3 Strap Setting

STRAPS



**NOTE**  
Unit select zero  
(no jumper) is  
invalid.

LED's

|     | FUNCTION                                    | REMARKS                                   |
|-----|---------------------------------------------|-------------------------------------------|
| LED | This LED is lit when the drive is selected. | Can only be seen if the cover is removed. |

Terminating resistors MVME842

|                   |                 |
|-------------------|-----------------|
| Type              | 14-2-151 (151Ω) |
| Nr. of pins       | 14 (DIP)        |
| Nr. of RNW/Device | 1               |

Switch Setting

Switch SW1 behind the front panel of the drive. The WREN III is configured by switching on/off the switches of SW1 on the Servo PCB. SW1 is located behind the front panel. To remove the front panel, loosen the 4 screws, holding the front panel, with a spline key.

#### **18.6.4 Installation**

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example how to initialize and how to create file systems, see chapter 1.

#### **18.6.5 Maintenance**

##### **Test and Diagnostics**

The MVME842 can be tested using the processor debugger and diagnostics., the drive can also be tested via the SSID tests.

##### **Preventive Maintenance**

The drive requires no preventive maintenance.

##### **Corrective Maintenance:**

For the corrective maintenance, see chapter 3.





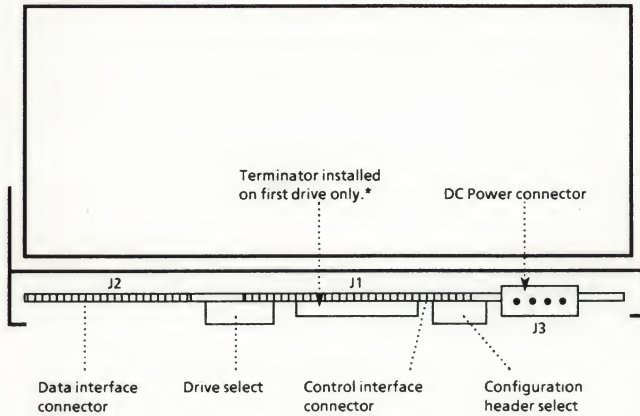
## 18.7 MVME843 CDC WREN V ESDI

### 18.7.1 Characteristics

For the technical data and the default disk templates, see section 18.1

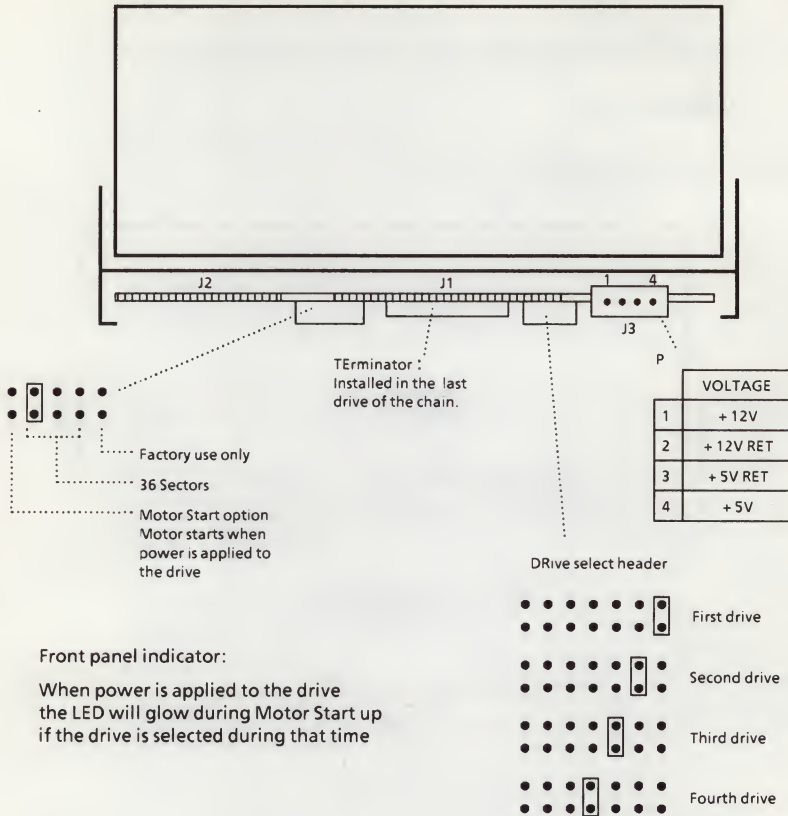
### 18.7.2 Connections

For connections to an MVME323, see 12.4.2.



\* The first drive is normally connected to the last connector from the daisy chain cable

### 18.7.3 Strap Setting



\* Terminating resistors MVME843

|                   |                   |
|-------------------|-------------------|
| Type              | 12-OX2-151 (151Ω) |
| Nr. of pins       | 12 (SIP)          |
| Nr. of RNW/Device | 1                 |

## **18.7.4 Installation**

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example how to initialize the disk drive and creating the file systems, see chapter 1.

## **18.7.5 Maintenance**

### **Test and Diagnostics**

The MVME843 CDC WREN V ESDI can be tested using the processor debugger and diagnostics. The drive can also be tested via SSID.

### **Preventive Maintenance**

The drive requires no preventive maintenance.

### **Corrective Maintenance**

For the corrective maintenance, see chapter 3.10 and 3.12.





## **18.8 MVME862/VME872 Seagate ST157NM SCSI**

The MVME872 is the same as MVME862 only the MVME872 has a 5.25" Front Panel.

The MVME862 and the MVME872 are both End Commercial Delivery.

### **18.8.1 Characteristics**

For the technical data and the default disk templates, see section 18.1.

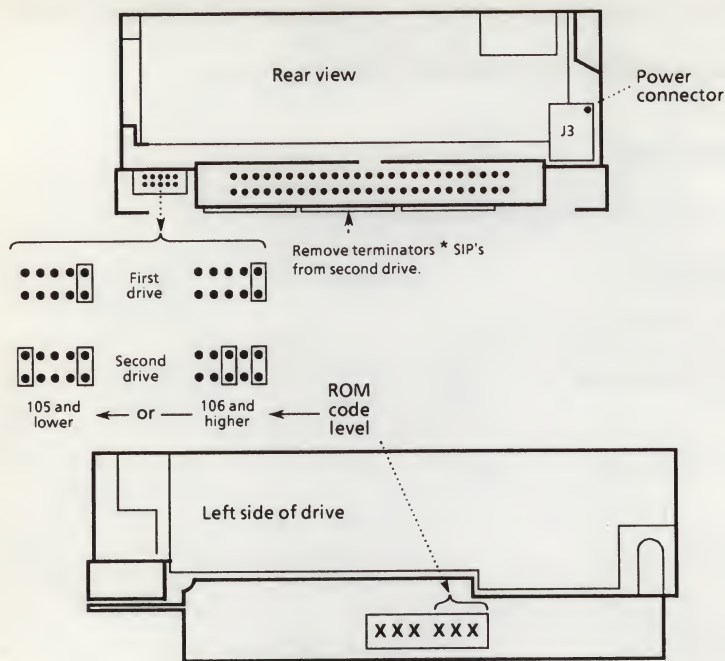
### **18.8.2 Connections**

For connections to an MVME147, see 9.6.2.

For connections to an MVME327A, see 12.5.2.

For connections to an MVME328, see 12.6.2.

18.8.3 Strap Setting



\* Terminating resistors MVME874 / 862

|                   |                          |
|-------------------|--------------------------|
| Type              | 8x-4- 221/331 (220/330Ω) |
| Nr. of pins       | 8 (SIP)                  |
| Nr. of RNW/Device | 3                        |

| STRAPS       | FUNCTION                                                          | SETTING                                |
|--------------|-------------------------------------------------------------------|----------------------------------------|
| P            | Enables parity check<br>closed = enabled<br>open = disabled       | closed                                 |
| DRIVE SELECT | Selects drive , 0 thru 7 binary encoded<br>open = 0<br>closed = 1 | closed<br>closed<br>open<br>(DEVICE 3) |

## LED's

There is one LED on the front panel of the drive. It can only be seen if the cover is removed. It normally glows up if the drive is selected.

### 18.8.4 Installation

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example, see chapter 1.

**NOTE:** *The SCSI bus must be terminated at both ends. If the MVMEW873 is to be the last one on the systems daisy chain, it will be necessary the terminating resistor networks to be installed.*  
*When the SCSI bus is terminated via active terminators, no terminators may be present on the disk drive. Active terminators are present at both ends of the SCSI cable.*

### 18.8.5 Maintenance

#### Test and Diagnostics

The MVME862/MVME872 can be tested using the processor debugger and diagnostics. The drive can also be tested via the SSID.

#### Preventive Maintenance

The drive requires no preventive maintenance.

#### Corrective Maintenance

See chapter 3.





**18.9 MVME863/MVME864 CDC SWIFT 94351-126  
CDC SWIFT 94351-200S**

**18.9.1 Characteristics**

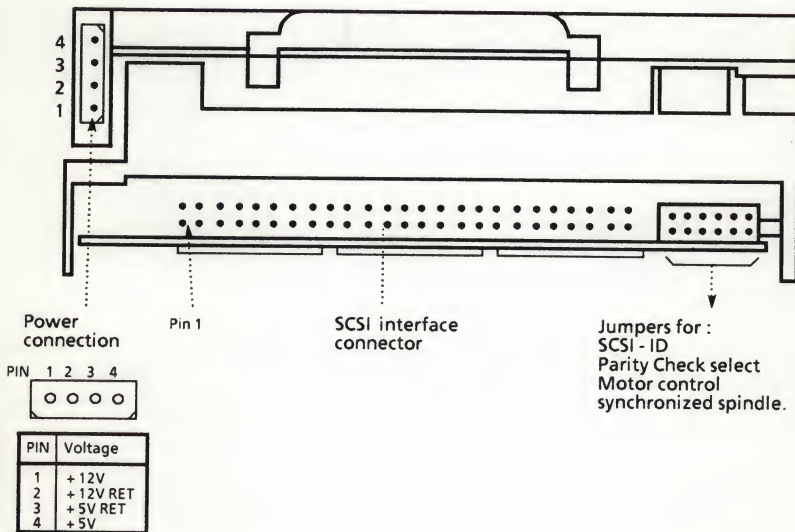
For the technical data and the default disk templates, see section 18.1.

**18.9.2 Connections**

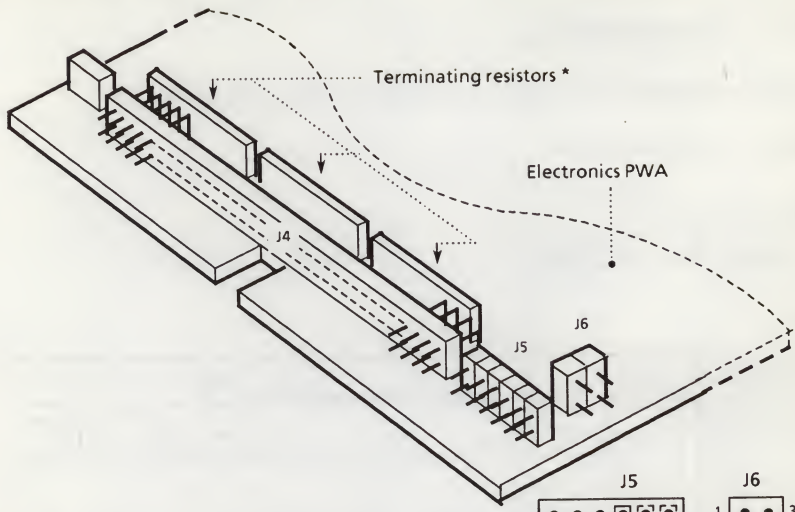
For connections to an:

MVME147 See section 9.6.2.

MVME147S See section 9.7.2.

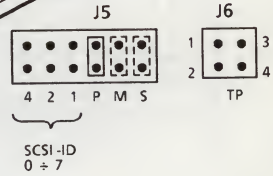


18.9.3 Strap Setting



\* Terminating resistors

|                   |             |
|-------------------|-------------|
| Type              | L85C221331G |
| Nr. of pins       | 8           |
| Nr. of RNW/Device | 3           |



| STRAPS  | FUNCTION                                                                                                                                                                                                                                                                                                                                                                                        | SETTING                              |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| SCSI-ID | Selects Cntr. LUN<br>0 through 7 binary encoded<br>0 = open, 1 = closed                                                                                                                                                                                                                                                                                                                         | Open<br>Open    Contr. LUN 0<br>Open |
| P       | Enables parity check<br>closed = enabled, open = disabled                                                                                                                                                                                                                                                                                                                                       | Closed                               |
| M       | Enables motor start option<br>closed = enabled, open = disabled                                                                                                                                                                                                                                                                                                                                 | Open                                 |
| S       | Enables synchronized rotation of multiple disk drives<br>closed = enabled, open = disabled                                                                                                                                                                                                                                                                                                      | Open                                 |
| TP      | Selects the terminator power source<br>none = no terminator installed<br>1-3    table terminator power from power connector (+5V)<br>1-2    table terminator power from SCSI interface cable<br>3-4    FXD supplies terminator power to the SCSI interface cable (terminators are removed)<br>1-2    } FXD supplies term. power to the SCSI interface cable and to the terminators.<br>3-4    } | 1-3 closed                           |

## LED's

There is one LED on the front panel of the drive. The LED lights up if the drive is selected.

### 18.9.4 Installation

For the installation and positioning rules, see chapter 2

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example, see chapter 1.

**NOTE:** *The SCSI-bus must be terminated at both ends.  
If the MVME863/MVME864 CDC Swift 94351 is the last on the systems daisy chain, the two terminating resistor networks must be installed on the drive.*

*When the SCSI bus is terminated with active termination, **no** terminator resistors may be present on the drive.*

### 18.9.5 Maintenance

#### Test and Diagnostics

The MVME863/MVME864 CDC Swift 94351 SCSI disk drives can be tested via:

- system firmware debugger (processor bug/diag)
- SSID

For details see chapter 3.

#### Preventive Maintenance

The drive requires no preventive maintenance.

#### Corrective Maintenance

See chapter 3.10.

The MVME863/864 are Field Replaceable Units.





## 18.10 MVME863A/MVME864A FUJITSU M2613ESA FUJITSU M2614ESA

The MVME863A and the MVME864A are the replacements for the MVME863 and the MVME864 CDC Swift disk drives.

### 18.10.1 Characteristics

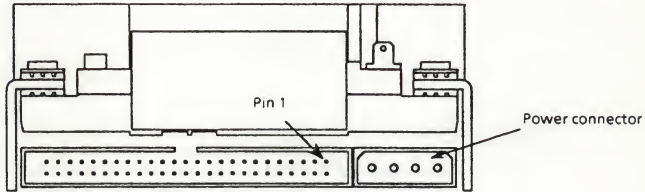
For the technical data and the default disk template, see section 18.1.

### 18.10.2 Connections

For connections to an:

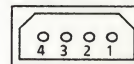
MVME147, see section 9.6.2, or 9.7.6

MVME327A, see section 12.5.2.



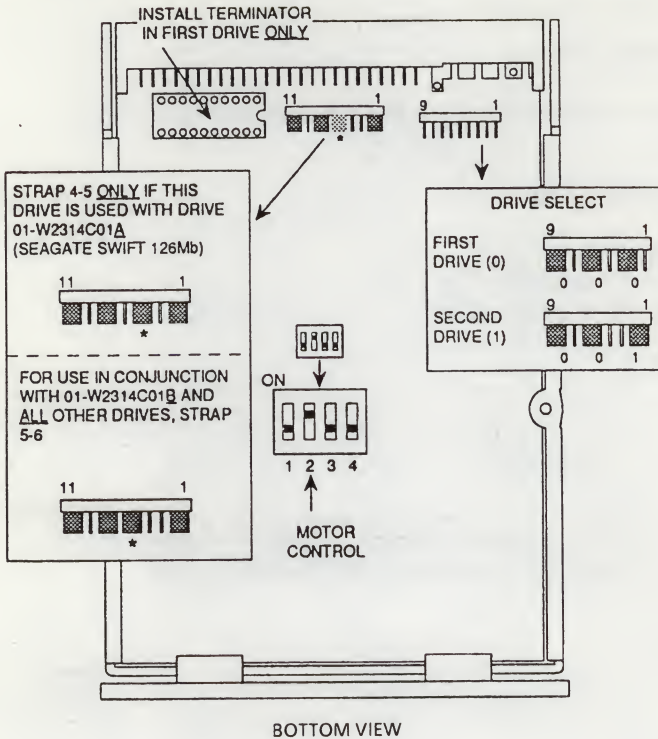
Rear view

Power  
connector



| PIN | Voltage  |
|-----|----------|
| 1   | +12V     |
| 2   | +12V RET |
| 3   | +5V RET  |
| 4   | +5V      |

### 18.10.3 Strap Setting



| CNH1.      | FUNCTION                                         | SETTING   |
|------------|--------------------------------------------------|-----------|
| 1-2        | SCSI Bus parity enable                           | 1-2       |
| 2-3        | SCSI Bus parity disable                          |           |
| 4-5        | Enable synchronous transfer negotiated by drive  | 5-6       |
| 5-6        | Disable synchronous transfer negotiated by drive |           |
| 8-9, 10-11 | Enable SCSI Bus Terminator Power source          | 7-8, 9-10 |
| 7-8, 9-10  | Enable Disk Drive Terminator Power source        |           |
| 7-8,10-11  | Enable autoswitch both sources (highest voltage) |           |

| CNH2        | FUNCTION  | SETTING<br>configuration dependent. |
|-------------|-----------|-------------------------------------|
| 2-3,5-6,8-9 | SCSI ID 0 | 1st disk                            |
| 1-2,5-6,8-9 | SCSI ID 1 | 2nd disk                            |
| 2-3,4-5,8-9 | SCSI ID 2 | 3th disk                            |
| 1-2,4-5,8-9 | SCSI ID 3 | 4th disk                            |
| 2-3,5-6,7-8 | SCSI ID 4 | reserved for tape units             |
| 1-2,5-6,7-8 | SCSI ID 5 | reserved for tape units             |
| 2-3,4-5,7-8 | SCSI ID 6 | reserved for floppy disk drives     |
| 1-2,4-5,7-8 | SCSI ID 7 | reserved for VME/SCSI bus adapter   |

| SW1   | FUNCTION                                                                    | SETTING            |
|-------|-----------------------------------------------------------------------------|--------------------|
| SW1-1 | Write protect                                                               | Off                |
| SW1-2 | Motor control,<br>on = self starting off = motor start required for spin-up | On<br>In P9050 Off |
| SW1-3 | Self diagnostic mode<br>on = test mode<br>off = normal mode                 | Off                |
| SW1-4 | Not used                                                                    | Off                |

### LED's

There is one LED on the front panel of the drive. The LED lights up if the drive is selected.



## 18.10.4 Installation

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example, see chapter 1.

**NOTE:**     *The SCSI-bus must be terminated at both ends.  
If the MVME863A nad MVME864A drive is the last on the systems daisy chain, the terminating resistor network must be installed on the drive.*

## 18.10.5 Maintenance

### Test and Diagnostics

The MVME863A and MVME864A drives can be tested with:

- Processor debugger
- SSID. The test dealing with the CDC Swift drives must be used

For details see chapter 3.

### Preventive Maintenance

The drive requires no preventive maintenance.

### Corrective Maintenance

See chapter 3.10.

The MVME863A/MVME864A are a Field Replaceable Unit.

## 18.11 MVME865/MVME866 FUJITSU M2622SA FUJITSU M2624SA

### 18.11.1 Characteristics

For the technical data and the default disk templates, see section 18.1.

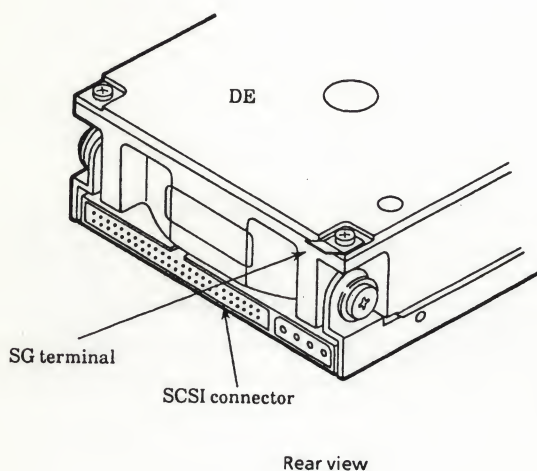
### 18.11.2 Connections

For connections to a MVME147, see section 9.6.2 or 9.7.2.

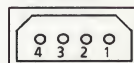
For connections to a MVME187, see section 9.10.2

For connections to a MVME327A, see section 12.5.2

For connections to a MVME328, see section 12.6.2

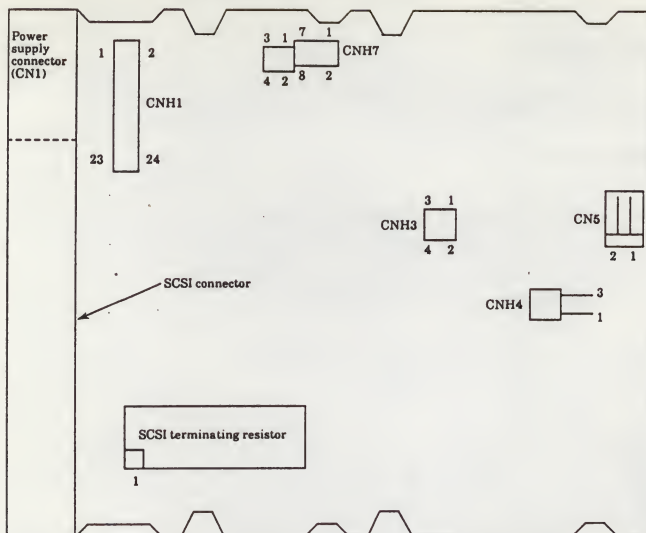


Power connector



| PIN | Voltage  |
|-----|----------|
| 1   | +12V     |
| 2   | +12V RET |
| 3   | +5V RET  |
| 4   | +5V      |

## 18.11.3 Strap Setting



NOTE: CNH2, CNH3 and CNH4 are factory set, **do not change them**

| CNH1  | FUNCTION                                                                                                                                      | SETTING        |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 1-2   | PER default value, 0 (closed) or 1 (open)                                                                                                     | OPEN           |
| 3-4   | SCSI level,, SCSI-1 (closed) or SCSI-2                                                                                                        | CLOSED         |
| 5-6   | Offline self-diagnostics, diagnostic mode (closed) or normal mode (open)                                                                      | OPEN           |
| 7-8   | UNIT ATTENTION report mode SCSI standard (closed) or special (open)                                                                           | CLOSED         |
| 9-10  | Reselection retry count, 10 (open) or unlimited (closed)                                                                                      | CLOSED         |
| 11-12 | (user setting inhibited)                                                                                                                      | CLOSED         |
| 13-14 | SCSI bus parity executed (closed) or not executed (open)                                                                                      | CLOSED         |
| 15-16 | Synchronous mode transfer request, enabled (closed) or disabled (open). Closed for the MVME187 and MVME328. Open for the MVME147 and MVME327A | CLOSED or OPEN |
| 17-18 | LED display requirements, LED on when drive active (closed) or when non active (open)                                                         | CLOSED         |
| 19-20 | Motor start option, start after power on (closed) or after start command (open)                                                               | OPEN           |
| 21-22 | SCSI terminating resistor power (from Drive)                                                                                                  | CLOSED         |
| 23-24 | SCSI terminating resistor power (from SCSI bus TERNPWR pin)                                                                                   | OPEN           |

| CHN7              | FUNCTION                                                                                                                        | SETTING                |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1-2<br>3-4<br>5-6 | SCSI ID, bit 0 (closed = 1)<br>SCSI ID, bit 1 (closed = 1)<br>SCSI ID, bit 2 (closed = 1)<br>Here as an <b>example set to 2</b> | OPEN<br>CLOSED<br>OPEN |
| 7-8               | Write protect, enabled (open), or disabled (closed)                                                                             | CLOSED                 |
| 9-10              | SCSI Bus Reset Normal operation (open), or force SCSI bus reset (closed)                                                        | OPEN                   |

**NOTE:** CN6 is an external SCSI address connector (not used)

### LED's

There is one LED on the front panel of the drive. The LED lights up if the drive is selected.

## 18.11.4 Installation

For the installation and positioning rules, see chapter 2.

When installed a disk drive it should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer.

For an example, see chapter 1.

**NOTE:** *The SCSI-bus must be terminated at both ends.  
If the MVME865/MVME866 drive is the last on the systems daisy chain, the terminating resistor network must be installed on the drive.*

## 18.11.5 Maintenance

### Test and Diagnostics

The MVME865 and MVME866 drives can be tested with:

- system firmware debugger (processor debugger bug/diag)
- SSID

### Preventive Maintenance

The drive requires no preventive maintenance.

### Corrective Maintenance

See chapter 3.10.

The MVME865/866 is a Field Replaceable Unit.





## 18.12 MVME873 Seagate ST296N SCSI

### 18.12.1 Characteristics

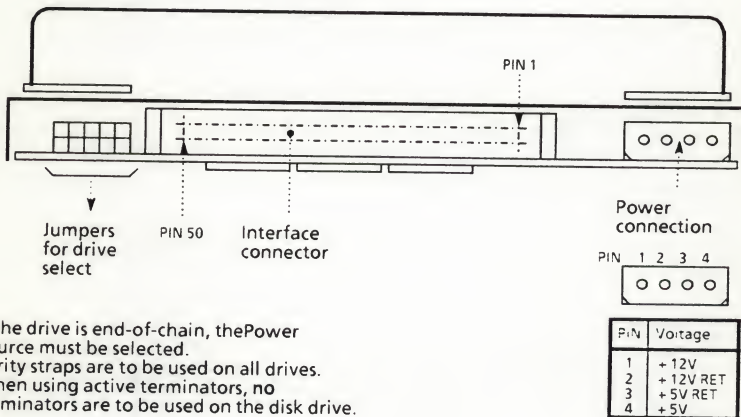
For the technical data and the default disk templates, see section 18.1.

### 18.12.2 Connections

For connections to an MVME147, see 9.6.2.

For connections to an MVME327A, see 12.5.2.

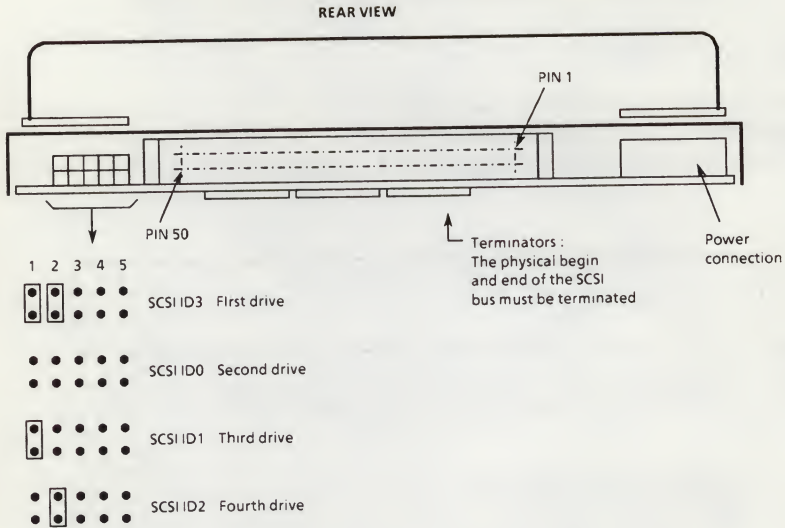
For connections to an MVME328, see 12.6.2



If the drive is end-of-chain, the Power Source must be selected.  
Parity straps are to be used on all drives.  
When using active terminators, no terminators are to be used on the disk drive.

### 18.12.3 Strap Setting

STRAPS:



\* Terminating resistors MVME873

|                   |                          |
|-------------------|--------------------------|
| Type              | 8x-4-221/331, (220/330Ω) |
| Nr. of pins       | 8 (SIP)                  |
| Nr. of RNW/Device | 3                        |

| STRAPS          | FUNCTION                                                          | SETTING                                           |
|-----------------|-------------------------------------------------------------------|---------------------------------------------------|
| DRIVE<br>SELECT | Selects drive , 0 thru 7 binary encoded<br>open = 0<br>closed = 1 | 1 = closed<br>2 = closed<br>3 = open<br>SCSI ID 3 |

### LED's

There is one LED on the front panel of the drive. It can only be seen if the cover is removed. It normally glows up if the drive is selected.

## 18.12.4 Installation

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example, see chapter 1.

**NOTE:** *The SCSI bus must be terminated at both ends. If the MVMEW873 is to be the last one on the systems daisy chain, it will be necessary the terminating resistor networks to be installed.*  
*When the SCSI bus is terminated via active terminators, no terminators may be present on the disk drive. Active terminators are present at both ends of the SCSI cable.*

## 18.12.5 Maintenance

### Test and Diagnostics

The MVME873 SEAGATE ST296N (SCSI) can be tested using the processor debugger and diagnostics. The drive can also be tested via the SSID.

### Preventive Maintenance

The drive requires no preventive maintenance.

### Corrective Maintenance

See chapter 3.





## 18.13 MVME874 CDC WREN III SCSI

### 18.13.1 Characteristics

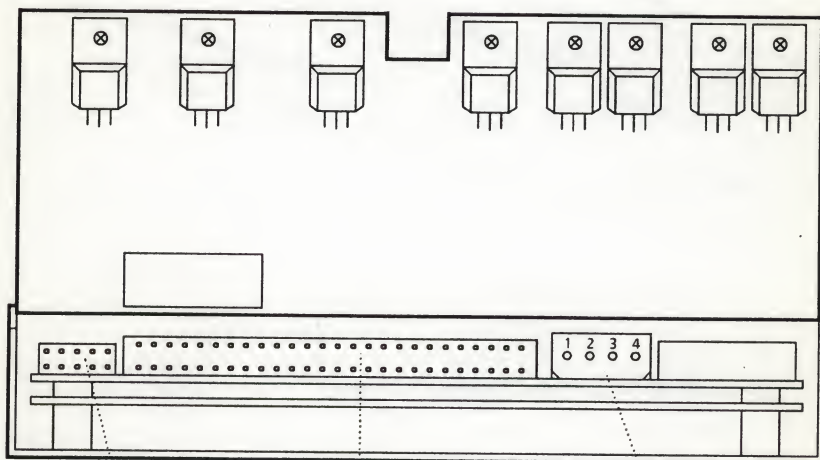
For the technical data and the default disk templates, see section 18.1.

### 18.13.2 Connections

For connections to an MVME147, see 9.6.2.

For connections to an MVME327A, see 12.5.2.

For connections to an MVME328, see 12.6.2.



Jumpers for:  
Motor start option  
Drive select  
Parity check select  
terminator  
power source

Interface connector

Power connector

A diagram of a 4-pin connector. The pins are numbered 1, 2, 3, and 4 from left to right. The connector is shown in a perspective view, with the pins protruding from a rectangular base.

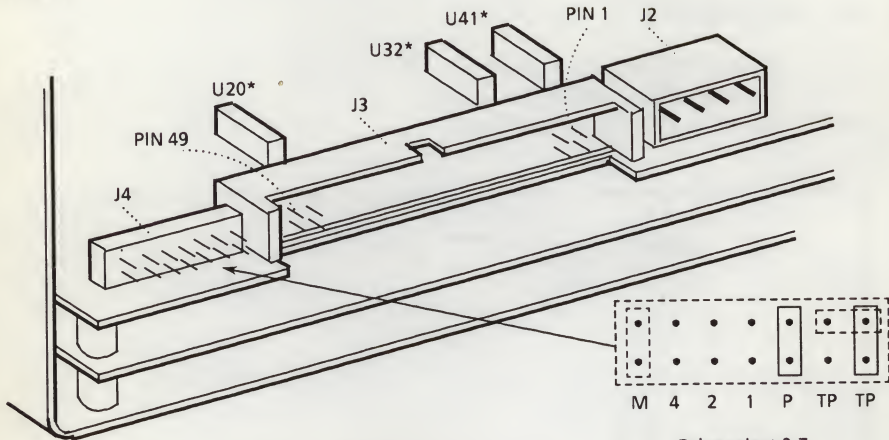
| PIN | Voltage  |
|-----|----------|
| 1   | +12V     |
| 2   | +12V RET |
| 3   | +5V RET  |
| 4   | +5V      |

### 18.13.3 Strap Setting

#### STRAPS

There are two types of interface PCB's possible:

#### TYPE 1:



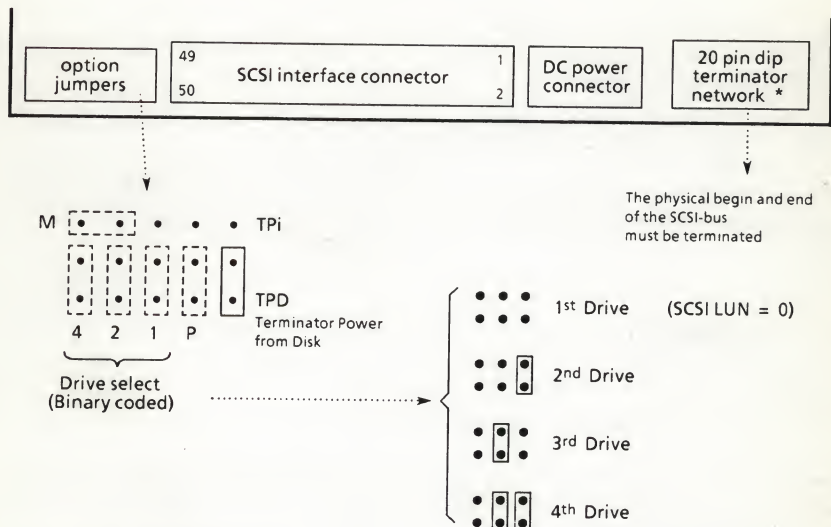
\* Terminating resistors MVME874

|                   |                           |
|-------------------|---------------------------|
| Type              | 8X-4- 221/331, (220/330Ω) |
| Nr. of pins       | 8 (SIP)                   |
| Nr. of RNW/Device | 3                         |

Drive select 0-7  
(Binary coded)

| STRAPS       | FUNCTION                                                                                                                                                                                                                                              | SETTING                            |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| M            | Enables motor start option<br>closed = enabled<br>open = disabled                                                                                                                                                                                     | open                               |
| DRIVE SELECT | Selects drive , 0 thru 7 binary encoded<br>open = 0<br>closed = 1                                                                                                                                                                                     | open<br>open<br>open<br>(DEVICE 0) |
| P            | enables parity check<br>closed = enabled<br>open = disabled                                                                                                                                                                                           | closed                             |
| TP           | Selects the terminator power source.<br>Jumper in the <b>vertical</b> position means power is taken from the <b>power connector</b><br><br>Jumper in the <b>horizontal</b> position means terminator power is taken from the <b>interface cable</b> . | vertical                           |

## TYPE 2



\* Terminating resistors MVME874

|                   |                               |
|-------------------|-------------------------------|
| Type              | 4120R-003 221/331, (220/330Ω) |
| Nr. of pins       | 20 (DIP)                      |
| Nr. of RNW/Device | 1                             |

| STRAPS       | FUNCTION                                                                                  | SETTING                                              |
|--------------|-------------------------------------------------------------------------------------------|------------------------------------------------------|
| M            | Enables motor start option<br>closed = enabled<br>open = disabled                         | open                                                 |
| DRIVE SELECT | Selects drive , 0 thru 7 binary encoded<br>open = 0<br>closed = 1                         | open SCSI Logical Unit<br>open number = 0<br>open    |
| P            | enables parity check<br>closed = enabled<br>open = disabled                               | open<br>Can also be closed → parity will be checked! |
| TPD          | Terminator power from drive.<br>closed = power is taken from the WREN III power connector | closed                                               |
| TPi          | Terminator power from interface.<br>closed = power is taken from the interface cable.     | open                                                 |



## **LED's**

There is one LED on the front panel of the drive. It can only be seen if the cover is removed. It normally glows up if the drive is selected.

### **If power up sequence is successful**

The LED glows steadily as the drive comes up to speed, when the LED extinguishes it is indicating that the drive is ready.

### **If power up sequence is not successful**

The front panel LED will glow for two seconds and then extinguish, the drive can be interrogated over the SCSI bus. If the fault condition prohibiting communications over the SCSI bus is detected during the power up sequence, the front panel LED will flash.

## **18.13.4 Installation**

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example how to initialize and how to create file systems, see chapter 1.

**NOTE 1:** *The SCSI bus must be terminated at both ends.*

*If the MVME874 WREN III SCSI is to be the last on the system's daisy chain, it will be necessary the terminating resistor network(s) (depending on the type of interface PCB) be installed.*

**NOTE 2:** *For Locator, see chapter 4.*

**REMARK:** *When initializing the drive via "dinit" or "sysadm" the drive will not give any indication that it is busy. This takes approximately 20-30 minutes.*

## **18.13.5 Maintenance**

### **Test and Diagnostics**

The MVME874 CDC WREN III SCSI can be tested using the processor debugger and diagnostics. The drive can also be tested via SSID.

### **Preventive Maintenance**

The drive requires no preventive maintenance.

### **Corrective Maintenance**

For the corrective maintenance, see chapter 3.

## 18.14 MVME875 CDC WREN IV SCSI

### 18.14.1 Characteristics

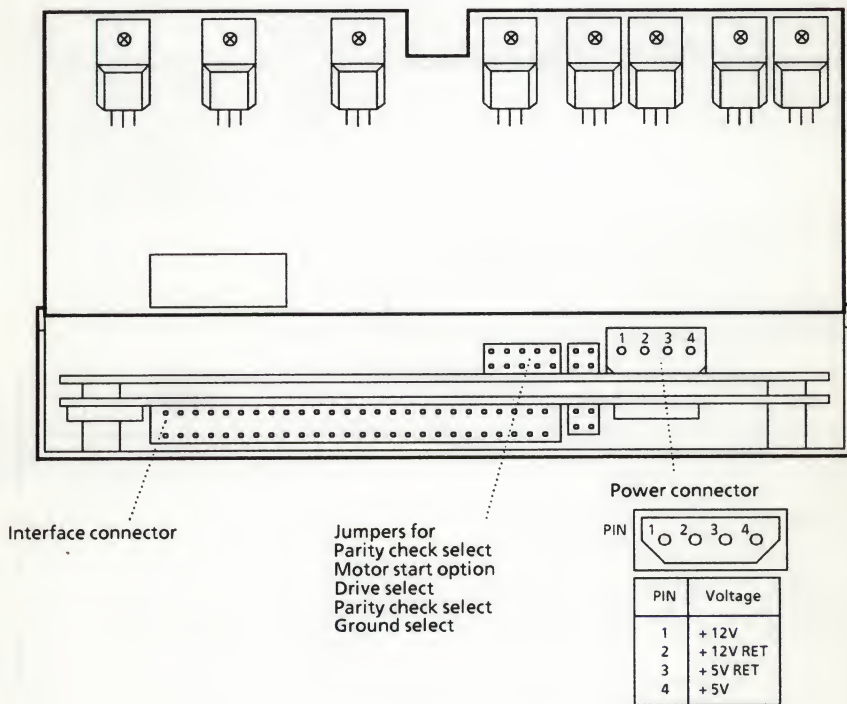
For the technical data and the default disk templates, see section 18.1.

### 18.14.2 Connections

For the connections to an MVME147, see 9.6.2 or 9.7.2

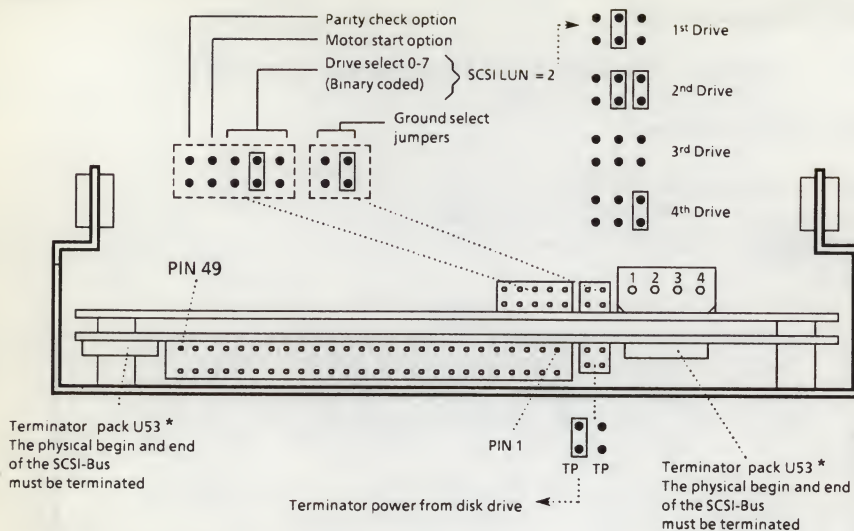
For connections to an MVME327A, see 12.5.2.

For connections to an MVME328, see 12.6.2.



## 18.14.3 Strap Setting

### STRAPS:



\* Terminating resistors MVME875

|                   |                              |
|-------------------|------------------------------|
| Type              | 411R-003 221/331, (220/330Ω) |
| Nr. of pins       | 20 (DIP)                     |
| Nr. of RNW/Device | 2                            |

| STRAPS       | FUNCTION                                                                                                                                                                                                                                              | SETTING                                             |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| PARITY CHECK | enables parity check<br>closed = enabled<br>open = disabled                                                                                                                                                                                           | open<br>Can also be closed, parity will be checked. |
| M            | Enables motor start option<br>closed = enabled<br>open = disabled                                                                                                                                                                                     | open                                                |
| DRIVE SELECT | Selects drive , 0 thru 7 binary encoded<br>open = 0<br>closed = 1                                                                                                                                                                                     | open closed open<br>SCSI Logical Unit number = 2    |
| GND SELECT   | Selects grounding via signal ground or via chasis ground.<br>1 - 2 = signal ground<br>3 - 4 = chasis ground                                                                                                                                           | 1 - 2                                               |
| TP           | Selects the terminator power source.<br>Jumper in the <b>vertical</b> position means power is taken from the <b>power connector</b><br><br>Jumper in the <b>horizontal</b> position means terminator power is taken from the <b>interface cable</b> . | vertical                                            |

## LED's

There is one LED on the front panel of the drive. It can only be seen if the cover is removed. It normally glows up if the drive is selected.

### If power up sequence is successful

The LED glows steadily as the drive comes up to speed, when the LED extinguishes it is indicating that the drive is ready.

### If power up sequence is not successful

The front panel LED will glow for two seconds and then extinguish, the drive can be interrogated over the SCSI bus. If the fault condition prohibiting communications over the SCSI bus is detected during the power up sequence, the front panel LED will flash.

## 18.14.4 Installation

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer.

**NOTE 1:** *The SCSI bus must be terminated at both ends.  
If the MVME875 WREN IV SCSI is to be the last on the system's daisy chain,  
it will be necessary that the terminating resistor networks be installed.*

**NOTE 2:** *For Locator, see chapter 4.*

## 18.14.5 Maintenance

### Test and Diagnostics

The MVME875 CDC WREN IV SCSI can be tested using the processor debugger and diagnostics. The drive can also be tested via SSID.

### Preventive Maintenance

The drive requires no preventive maintenance.

### Corrective Maintenance

See chapter 3.





## 18.15 MVME876 CDC WREN V SCSI

### 18.15.1 Characteristics

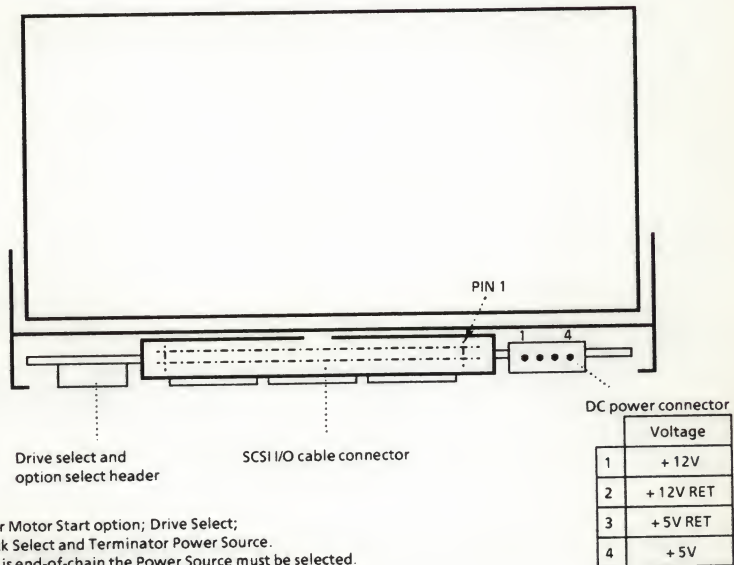
For the technical data and the default disk templates, see section 18.1

### 18.15.2 Connections

For connections to an MVME147, see 9.6.2.

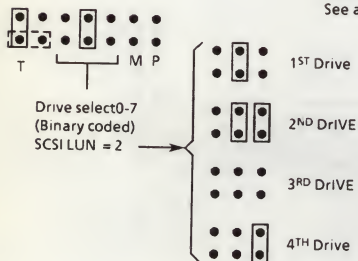
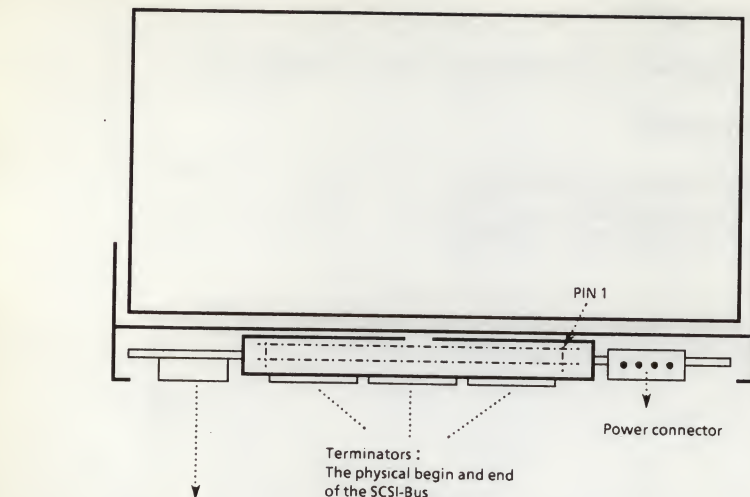
For connections to an MVME327A, see 12.5.2.

For connections to an MVME328, see 12.6.2.



Jumpers for Motor Start option; Drive Select;  
Parity Check Select and Terminator Power Source.  
If the drive is end-of-chain the Power Source must be selected.  
Parity straps are to be used on all drives.  
When using active terminators, **no** resistor terminators are to be used  
on the drive.

## 18.15.3 Strap Setting



### \* Terminating resistors MVME876

|                   |                         |
|-------------------|-------------------------|
| Type              | 8x-4-221/331 (220/330Ω) |
| Nr. of pins       | 8 (SIP)                 |
| Nr. of RNW/Device | 3                       |

| STRAPS       | FUNCTION                                                                                                                                                                                                | SETTING                              |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| T            | Terminator power from disk drive (vertical) .<br>Terminator power from interface (horizontal).                                                                                                          | Closed (vertical).                   |
| M            | Motor start option.<br>If installed drive will wait for a Start Unit Command from the Host before starting the motor.<br>Not installed the motor will start as soon as DC power is applied by the Unit. | Open                                 |
| Drive Select | Selects drive.                                                                                                                                                                                          | See above                            |
| P            | Parity check option.                                                                                                                                                                                    | Open.<br>If closed parity is checked |

#### 18.15.4 Installation

For the installation and positioning rules, see section 18.1.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example, see chapter 1.

**NOTE:** *The SCSI bus must be terminated at both ends. If the MVME876 is to be the last one on the SCSI bus, it will be necessary that the terminators are present.*

*When the SCSI bus is terminated via active terminators, no terminators are to be present on the disk drive itself.*

*Active terminators are present on both end of the cable.*

#### 18.15.5 Maintenance

##### Test and Diagnostics

The MVME876 CDC WREN V SCSI can be tested using processor debugger and diagnostics. The drive can also be tested via SSID.

##### Preventive Maintenance

The drive requires no preventive maintenance.

##### Corrective Maintenance

See chapter 3.

The MVME876 is a Field Replaceable Unit.





## 18.16 MVME877 CDC WREN VII SCSI

### 18.16.1 Characteristics

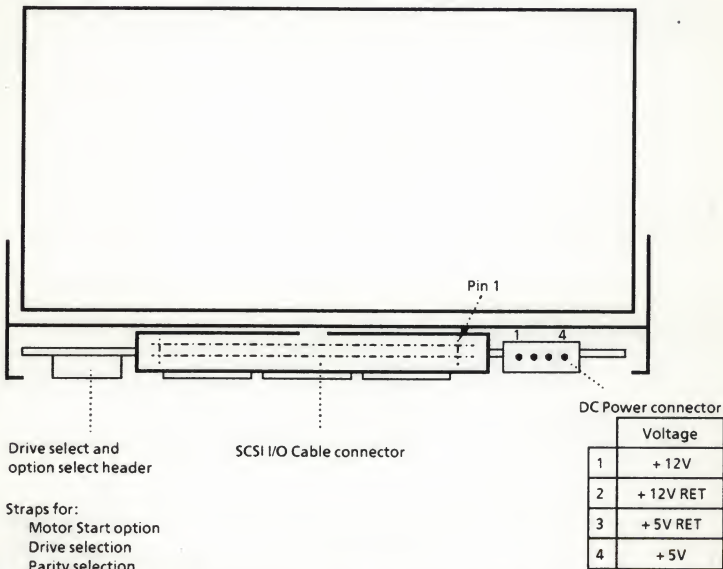
For the technical data and the default disk template, see section 18.1.

### 18.16.2 Connections

For connections to a MVME147, see 9.6.2, or 9.7.2.

For connections to a MVME327A, see 12.5.2.

For connections to a MVME328, see 9.6.2.

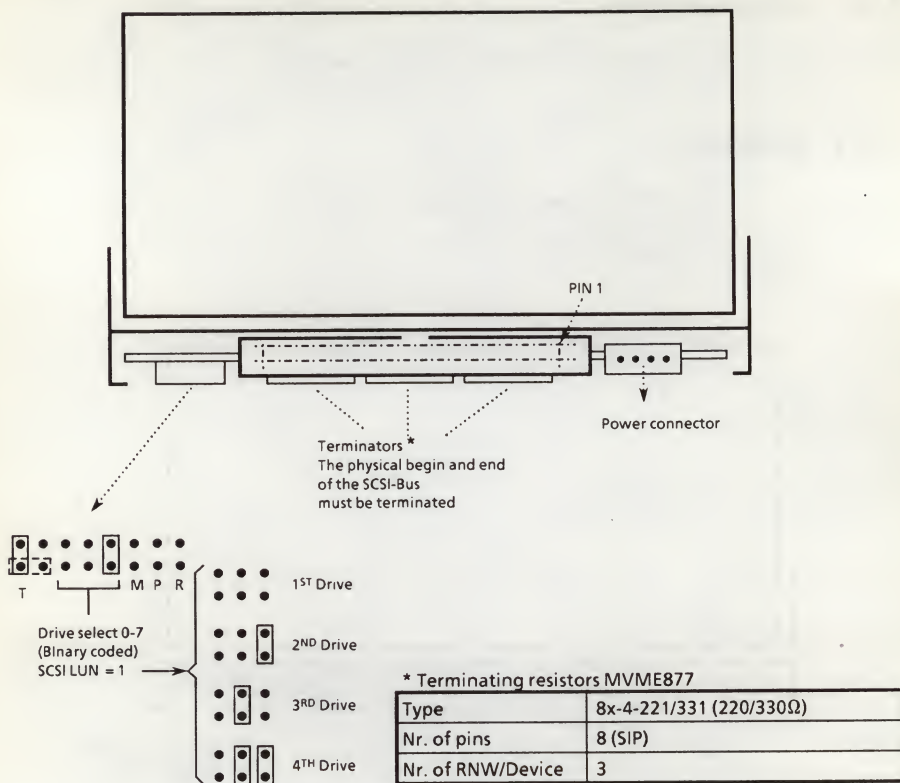


Straps for:

- Motor Start option
- Drive selection
- Parity selection
- Terminator Power source

If the drive is the last one in the SCSI chain, the Power source must be selected.  
When using active terminators, **no** resistor terminators may be used.

### 18.16.3 Strap Setting



| STRAPS       | FUNCTION                                                                                                                                                                                                | SETTING                              |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| T            | Terminator power from disk drive (vertical) .<br>Terminator power from interface (horizontal).                                                                                                          | Closed (vertical).                   |
| M            | Motor start option.<br>If installed drive will wait for a Start Unit Command from the Host before starting the motor.<br>Not installed the motor will start as soon as DC power is applied by the Unit. | Open                                 |
| Drive Select | Selects drive.                                                                                                                                                                                          | See above                            |
| P            | Parity check option.                                                                                                                                                                                    | Open.<br>If closed parity is checked |
| R            | Reserved Jumper Position                                                                                                                                                                                | Open.                                |

## 18.16.4 Installation

For the installation and positioning rules, see chapter 2.

After a disk drive is installed, the drive should be initialized (formatted) and file systems should be created. This is the responsibility of the system administrator, the customer. For an example, see chapter 1.

**NOTE:** *The SCSI bus must be terminated at both ends.  
If the MVME877 WREN VII SCSI is to be the last on the system's daisy chain, it will be necessary that the terminating resistor networks be installed.*

*When the SCSI bus is terminated via active terminators, no resistor terminators are to be present on the drive. Active terminators are present on both ends of the SCSI cable.*

## 18.16.5 Maintenance

### Test and Diagnostics

The MVME877 CDC WREN VII SCSI can be tested using processor debugger and diagnostics. The drive can also be tested via SSID.

### Preventive Maintenance

The drive requires no preventive maintenance.

### Corrective Maintenance

See chapters 3.10 and 3.12.

The MVME877 is a Field Replaceable Unit.





## 18.17 MVME881A TEAC FD-55GS 751-U SCSI

The MVME881A is the successor of the MVME881 SCSI flexible disk drive. The MVME881A is made up out of:

- Flexible disk drive FD-55GFR 701-U
- SCSI adapter, TEAC part number 15532137-01

The MVME881A is released on the MVME147 with R3V6 or higher, and on the MVME328 and MVME187 with release R32V2 or higher.

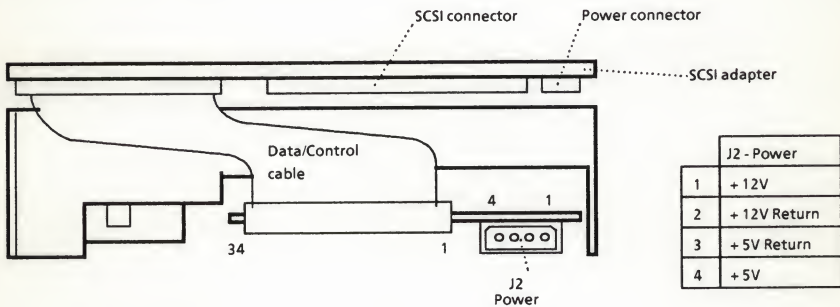
### 18.17.1 Characteristics

For the technical data and the default disk templates, see section 18.1.

### 18.17.2 Connections

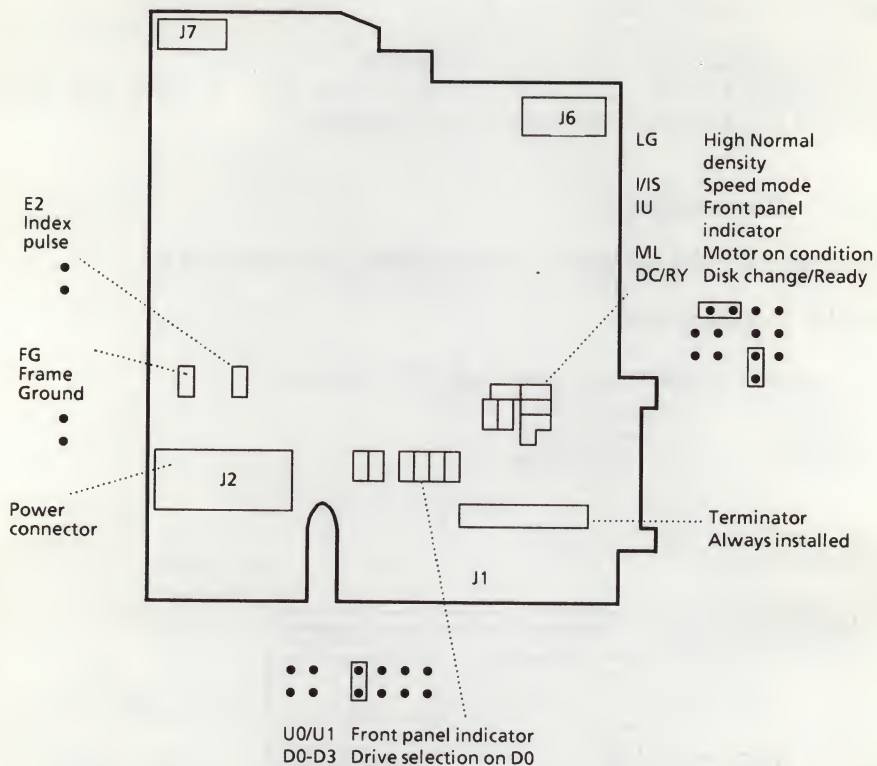
For connection of an MVME881A FDD with SCSI-interface to:

- MVME147      See section 9.6.2 or 9.7.2.  
MVME187      See section 9.9.2.  
MVME328      See section 12.6.2.

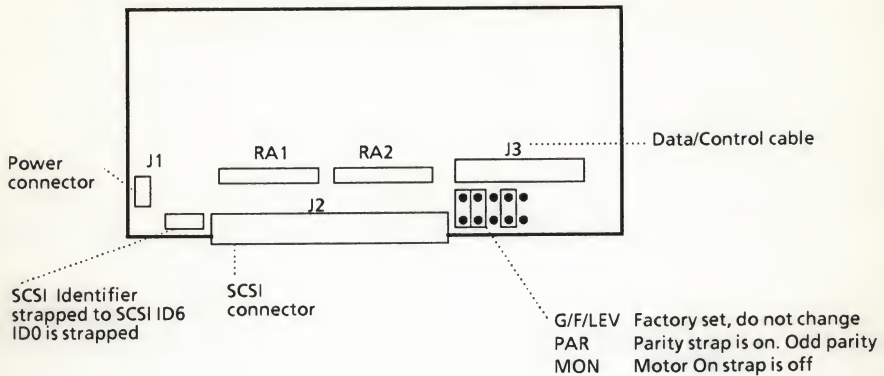


## 18.17.3 Strap Setting

### Straps on the Flexible Disk Drive



## Straps on the SCSI adapter



### 18.3.4 Installation

For the installation and positionings rules, see chapter 2.

When using a new diskette it should be initialized (formatted) and, if necessary, file system(s) should be created. This is the responsibility of the system administrator, the customer.

For an example, see chapter 1.

### 18.3.5 Maintenance

#### Test and Diagnostics

The Flexible Disk Drive MVME881A TEAC FD-55GS 751-U can be tested using the processor debugger and diagnostics. Also the SSID can be used.

#### Preventive Maintenance

The drive requires normally no preventive maintenance.

Head cleaning may be necessary. Use cleaning kit S/CP 04. (8709 004 10411).

#### Corrective Maintenance

See chapter 3.10.

The MVME831XT/832XT/883 is a Field Replaceable Unit.





## 18.18 MVME884 TEAC FD-235 JS-401 SCSI

### 18.18.1 Characteristics

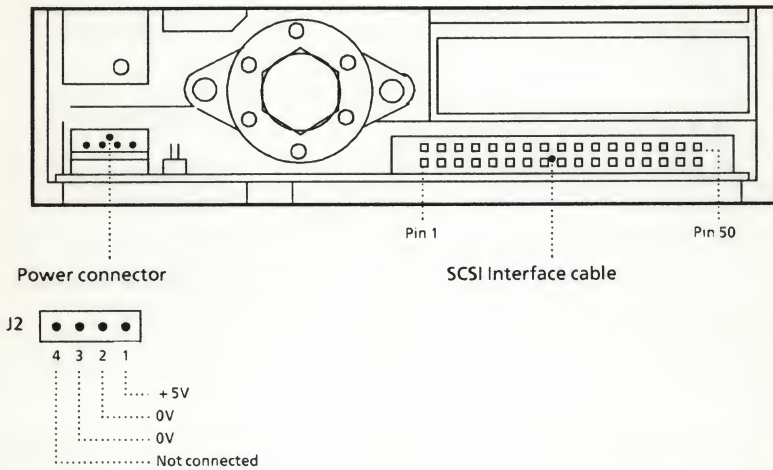
For the technical data and the default disk templates, see sec tection 18.1

### 18.18.2 Connections

For connections to an:

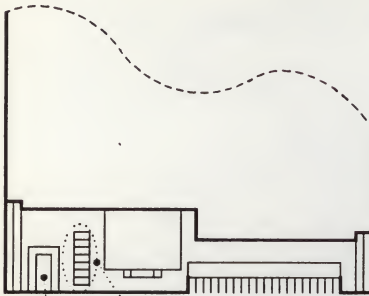
MVME147 See chapter 9.6.2.

MVME147S See section 9.7.2.



### 18.18.3 Strap Setting

Main PCB



J2

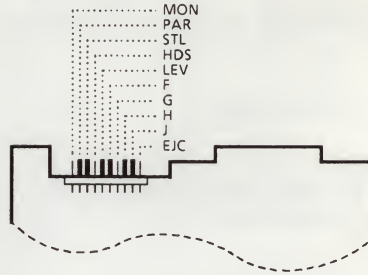
Power connector



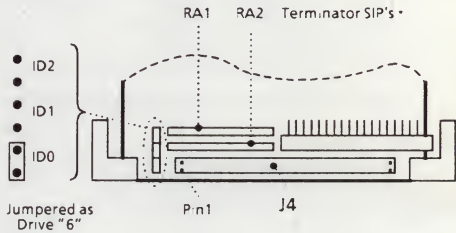
\* Terminating resistors MVME884

|                   |      |
|-------------------|------|
| Type              | tb f |
| Nr. of pins       | tb f |
| Nr. of RNW/Device | 2    |

SCSI adapter (bottom view)



SCSI Adapter (top view)



Main PCB

| STRAPS         | FUNCTION                                   | SETTING                | REMARKS                                    |
|----------------|--------------------------------------------|------------------------|--------------------------------------------|
| AC             | Auto chucking enable/disable               | Open                   | Auto chucking enable                       |
| RE             | Recalibrate enable/disable                 | Closed                 | Automatic re-calibrate to track 00 enabled |
| IR             | Turn-on condition of front panel indicator | Open                   | LED is on when drive select is true        |
| RY             | Select output signal function on pin 34    | Open                   | Disk change signal is output               |
| D2<br>D1<br>D0 | Drive select straps                        | Open<br>Open<br>Closed | Select device 0                            |

## SCSI Adapter

| STRAPS                                       | FUNCTION                                                                 | SETTING                                                                | REMARKS                                                                                     |
|----------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| SCSI-ID                                      | Selects Ctrl.LUN<br>0 through 7 binary encoded<br>open = 1<br>closed = 0 | Open<br>Open<br>Closed                                                 | Ctrl.LUN 6                                                                                  |
| MON                                          | Set Motor On - signal at power<br>on (pin 16)                            | Open                                                                   | Motor Off                                                                                   |
| PAR                                          | Parity check enable/disable                                              | Closed                                                                 | Check parity of input data<br>enabled                                                       |
| STL<br>HDS<br>LEV<br>F<br>G<br>H<br>J<br>EJC |                                                                          | Closed<br>Open<br>Closed<br>Closed<br>Open<br>Closed<br>Closed<br>Open | Factory set, if the setting of<br>these straps are changed,<br>operation is not guaranteed. |

### 18.18.4 Installation

For the installation and positioning rules see chapter 2.

When using a new diskette it should be initialized (formatted) and, if necessary, file system(s) should be created. This is the responsibility of the system administrator, the customer.

For an example, see chapter 1.

**NOTE:** *The SCSI-bus must be terminated at both ends.  
If the MVME884 TEAC-235 JS-401 is the last on the system's daisy chain,  
the two resistor networks must be installed on the drive.*

*When the SCSI bus is terminated via active terminators, no terminators  
present on the FDD. Active terminators are present at both ends of the SCSI  
cable.*

### 18.18.5 Maintenance

#### Test and Diagnostics

The TEAC FD-235 JS-401 can be tested with:

- System firmware debugger (processor bug/diag)
- SSID.

For details see chapter 3.



**Preventive Maintenance**

The drive requires normally no preventive maintenance.

Head cleaning may be necessary. Use cleaning kit S/CP 33 (12NC 8709 004 13301).

**Corrective Maintenance**

The MVME884 is a Field Replaceable Unit.

## 19 TAPE DRIVES

Section:

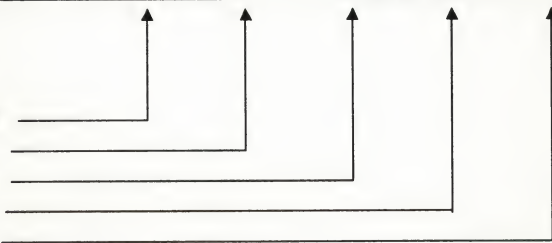
Page:

|                   |        |
|-------------------|--------|
| 1: Technical Data | 19.1-1 |
|-------------------|--------|

|                                   |         |         |         |         |         |
|-----------------------------------|---------|---------|---------|---------|---------|
| 2: MVME851<br>Archive 5945L-2     | 19.2-1  | 19.2-1  | 19.2-2  | 19.2-5  | 19.2-5  |
| 3: MVME853<br>Archive 2150S       | 19.3-1  | 19.3-1  | 19.3-2  | 19.3-3  | 19.3-3  |
| 4: MVME853Q<br>Archive 2150L      | 19.4-1  | 19.4-1  | 19.4-2  | 19.4-3  | 19.4-3  |
| 5: MVME854<br>Archive 2525S       | 19.10-1 | 19.10-1 | 19.10-2 | 19.10-6 | 19.10-6 |
| 6: MVME855<br>TEAC-2ST / N50-00-U | 19.5-1  | 19.5-1  | 19.5-2  | 19.5-3  | 19.5-3  |
| 7: MVME856<br>EXA-8200 2GB        | 19.6-1  | 19.6-1  | 19.6-2  | 19.6-3  | 19.6-4  |
| 8: P3544-001<br>CIPHER M890/M891  | 19.7-1  | 19.7-1  | 19.7-2  | 19.7-4  | 19.7-14 |
| 9: P3549-001<br>CIPHER M990       | 19.8-1  | 19.8-1  | 19.8-2  | 19.8-4  | 19.8-6  |
| 10: P3540-702<br>SCSI Adapter     | 19.9-1  | 19.9-1  | 19.9-2  | 19.9-6  | 19.9-6  |

Subsection:

- 1 Characteristics
- 2 Connections
- 3 Strap Settings
- 4 Installation
- 5 Maintenance



**NOTE:** *n.a. means that this section is not available for this unit.*



## 19.1 TECHNICAL DATA

| Streamer Tape devices               | MVME852                          | MVME853                                       | MVME853Q                                     |
|-------------------------------------|----------------------------------|-----------------------------------------------|----------------------------------------------|
| Manufacturer<br>Type number         | Archive<br>5945-L2               | Archive<br>2150S                              | Archive<br>2150L                             |
| Size                                | 5.25" Full height                | 5.25" Half height                             | 5.25" Half height                            |
| Storage capacity                    | 60Mbyte                          | 150Mbyte                                      | 150Mbyte                                     |
| Media identification                | S/CA04                           | S/CA06 S/CA09                                 | S/CA06 S/CA09                                |
| Recording mode                      | NRZI                             | NRZI                                          | NRZI                                         |
| No. of Tracks                       | 9 (QIC-24)                       | 15 (S/CA06)<br>18 (S/CA09)                    | 15 (S/CA06)<br>18 (S/CA09)                   |
| Blocklength in Bytes                | 512                              | 512                                           | 512                                          |
| Density bits/inch                   | 8.000                            | 10.000                                        | 10.000                                       |
| Transfer Speed                      | 90Kbytes/sec                     | 112.5Kbytes/sec                               | 112.5Kbytes/sec                              |
| Tape Speed                          | 90 inch/sec                      | 90 inch/sec                                   | 90 inch/sec                                  |
| Start Stop Time                     | 300 ms (max)                     | 300 ms (max)                                  | 300 ms (max)                                 |
| Controller                          | MVME350                          | MVME147<br>MVME187<br>MVME327A<br>MVME328-1/2 | MVME350                                      |
| Interface<br>Drive Controller       | QIC-02                           | SCSI                                          | QIC-02                                       |
| Test Programs                       | Processor bug<br>SSID            | Processor bug<br>SSID                         | Processor bug<br>SSID                        |
| Power Requirements<br>+ 12V<br>+ 5V | typ max surge<br>1.75A 2.4A 4.0A | typ max surge<br>0.8A 1.5A 2.5A<br>0.5A 0.7A  | typ max surge<br>0.8A 1.5A 2.5A<br>0.5A 0.7A |



| Streamer Tape devices               | MVME854                                       | MVME855                                      | MVME856                                       |
|-------------------------------------|-----------------------------------------------|----------------------------------------------|-----------------------------------------------|
| Manufacturer<br>Type number         | Archive<br>2525S                              | TEAC<br>MT-2ST N50                           | EXABYTE<br>EXB-8200                           |
| Size                                | 5.25" Half height                             | 3.5" Half height                             | 5.25" Full height                             |
| Storage capacity                    | 525Mbyte                                      | 155Mbyte                                     | 256 to 2000Mbyte                              |
| Media identification                | S.CA06, 09, 13, 15                            | D CAS-25 D CAS-85                            | S CA10 S CA11 S CA-12                         |
| Recording mode                      | NRZI                                          | NRZI                                         | GCR                                           |
| No. of Tracks                       | 15 (S CA06)<br>18 (S CA09)<br>26 (S CA 13.15) | 9 (D CAS-25)<br>17 (D CAS-85)                | Advanced helical scan                         |
| Blocklength in Bytes                | 512                                           | 512                                          | 1024                                          |
| Density bits inch                   | 16.000                                        | 12.800                                       | 43.200                                        |
| Transfer Speed                      | 240Kbytes/sec                                 | 395Kb sec (recording)<br>435Kb sec (reading) | 246Kbytes sec (Avg)<br>1.5Mbytes sec (Max)    |
| Tape Speed                          | 120 inch/sec                                  | 90 inch/sec                                  | 0.43 inch/sec                                 |
| Start/Stop Time                     | 300 ms (max)                                  | 300 ms (max)                                 |                                               |
| Controller                          | MVME187<br>MVME328-1 2                        | MVME147<br>MVME327A<br>MVME328-1 2           | MVME147<br>MVME187<br>MVME327A<br>MVME328-1 2 |
| Interface Drive Controller          | SCSI                                          | SCSI                                         | SCSI                                          |
| Test Programs                       | Processor bug<br>SSID                         | Processor bug<br>SSID                        | Processor bug<br>SSID                         |
| Power Requirements<br>+ 12V<br>+ 5V | typ max surge<br>1.3A 0.8A                    | typ max surge<br>1.3A 0.8A                   | typ max surge<br>1.2A 4.0A                    |

| Tape devices                     | P3544-001                                                              | P3544-001                                                              | P3549-001                                                                |
|----------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Manufacturer<br>Type number      | Cipher<br>M890                                                         | Cipher<br>M891                                                         | Cipher<br>M990                                                           |
| Size                             |                                                                        |                                                                        |                                                                          |
| Height                           | 8.75" (22.2cm)                                                         | 8.75" (22.2cm)                                                         | 14" (22.2cm)                                                             |
| Width                            | 17" (43.2cm)                                                           | 17" (43.2cm)                                                           | 19" (43.2cm)                                                             |
| Depth                            | 22" (55.9cm)                                                           | 22" (55.9cm)                                                           | 24.5" (55.9cm)                                                           |
| Storage capacity<br>2400 ft tape | 46Mbytes at 1600BPI<br>92Mbytes at 3200BPI                             | 46Mbytes at 1600BPI<br>92Mbytes at 3200BPI                             | 46Mbytes at 1600BPI<br>92Mbytes at 3200BPI                               |
| Media identification             | S.TA01 2400 ft tape<br>S.TA02 1200 ft tape<br>S.TA03 600 ft tape       | S.TA01 2400 ft tape<br>S.TA02 1200 ft tape<br>S.TA03 600 ft tape       | S.TA01 2400 ft tape<br>S.TA02 1200 ft tape<br>S.TA03 600 ft tape         |
| Recording mode                   | PE                                                                     | PE                                                                     | PE GCR                                                                   |
| No. of Tracks                    | 9                                                                      | 9                                                                      | 9                                                                        |
| Blocklength in Bytes             |                                                                        |                                                                        |                                                                          |
| Density bits/inch                | 1600                                                                   | 1600 3200                                                              | 1600 3200 6250                                                           |
| Transfer Speed                   | 20Kb sec to 120Kb sec                                                  | 75Kb sec to 500Kb sec                                                  | 70.3Kb sec to 632Kb sec                                                  |
| Tape Speed                       | 100 inch/sec                                                           | 100 inch/sec                                                           | 100 inch/sec (1600BPI)<br>70 inch/sec (6250BPI)<br>50 inch/sec (3200BPI) |
| Reposition Time                  | 1.08 sec                                                               | 1.08 sec                                                               | 1.080 sec (1600 PE)<br>0.540 sec (3200 PE)<br>0.743 sec (6250 GCR)       |
| Controller                       | MVME355 (Pertec)<br>P3540-702 *<br>(MVME147)<br>(MVME327)<br>(MVME328) | MVME355 (Pertec)<br>P3540-702 *<br>(MVME147)<br>(MVME327)<br>(MVME328) | MVME355 (Pertec)<br>P3540-702 *<br>(MVME147)<br>(MVME327)<br>(MVME328)   |
| Interface<br>Drive Controller    | Pertec<br>SCSI (P3540-702)                                             | Pertec<br>SCSI (P3540-702)                                             | Pertec<br>SCSI (P3540-702)                                               |
| Test Programs                    | Processor bug<br>SSID                                                  | Processor bug<br>SSID                                                  | Processor bug<br>SSID                                                    |
| Power Requirements               | 85 . . . 264Vac<br>270W max                                            | 85 . . . 264Vac<br>270W max                                            | 100 . . . 240Vac<br>400W max                                             |

**Note:** The P3544-702 is the SCSI adapter for the 9-track tape drives, this P3544-702 is connected to the external SCSI plug of the transition module of the SCSI adapter, see also section 9.6.2 ; 9.7.2; 12.5.2 and 12.6.2.

## Media Specification

|                      | CARTRIDGE<br>TYPE                              | CAPACITY                               | LENGTH                                                                                                                              | FORMAT                                          |                                                 |
|----------------------|------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
|                      |                                                |                                        |                                                                                                                                     | WRITE                                           | READ                                            |
| MVME851              | S CA04<br>S CA06<br>S CA09                     | 45Mb<br>60Mb<br>60Mb*                  | 137m<br>183m<br>183m                                                                                                                | QIC11.24                                        | QIC11.24                                        |
| MVME853<br>MVME853Q  | S CS04<br>S CA06<br>S CA09                     | **<br>125Mb<br>150Mb                   | 137m<br>183m<br>183m                                                                                                                | --<br>QIC120<br>QIC150                          | QIC11.24<br>QIC120<br>QIC150                    |
| MVME854              | S CS04<br>S CA06<br>S CA09<br>S CA13<br>S CA15 | **<br>125Mb<br>150Mb<br>320Mb<br>525Mb | 137m<br>183m<br>183m<br>183m<br>300m                                                                                                | QIC120<br>QIC150<br>QIC525<br>QIC525            | QIC24<br>QIC120<br>QIC150<br>QIC525             |
| MVME855              | CT-600N                                        | 155Mb                                  | T.b.f.                                                                                                                              | D.CAS-85                                        | D CAS-85<br>D CAS-25                            |
| MVME856              | S CA10<br>S CA11<br>S CA12                     | 291Mb<br>583Mb<br>2332Mb               | 15m<br>28m<br>106m                                                                                                                  | 8mm helical<br>scan                             | 8mm helical<br>scan                             |
| M890<br>M891<br>M990 | STA01-X<br><br>STA02-X<br><br>STA03-X          |                                        | 2400 Feet<br>(732m) on<br>10.5 inch reel<br><br>1200 Feet<br>(366m) on<br>8.5 inch reel<br><br>600 Feet<br>(183m) on<br>7 inch reel | Phase Encoding<br>or<br>Group Code<br>Recording | Phase Encoding<br>or<br>Group Code<br>Recording |

\* More expensive as S/CA06, therefore not feasible

\*\* Only Read Mode

## 19.2 MVME851 Archive 5945L-2

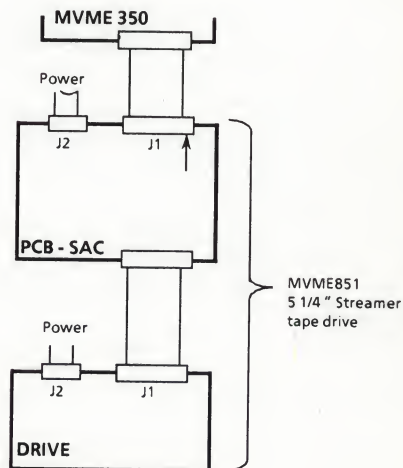
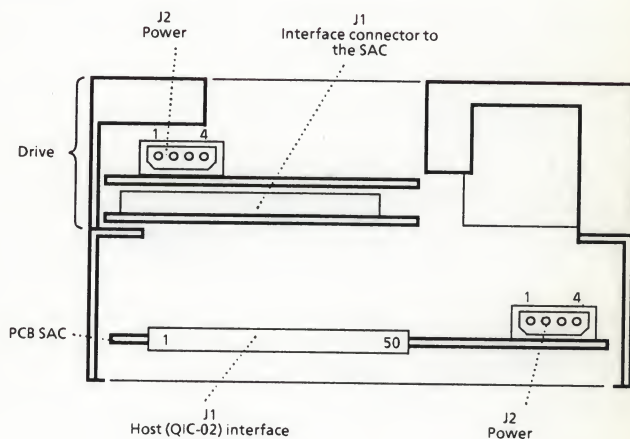
The MVME851 streamer tape device is End Commercial Delivery

### 19.2.1 Characteristics

For the characteristics see section 19.1.

### 19.2.2 Connections

|   | Power Conn.  |
|---|--------------|
| 1 | + 12V        |
| 2 | + 12V Return |
| 3 | + 5V RReturn |
| 4 | + 5V         |

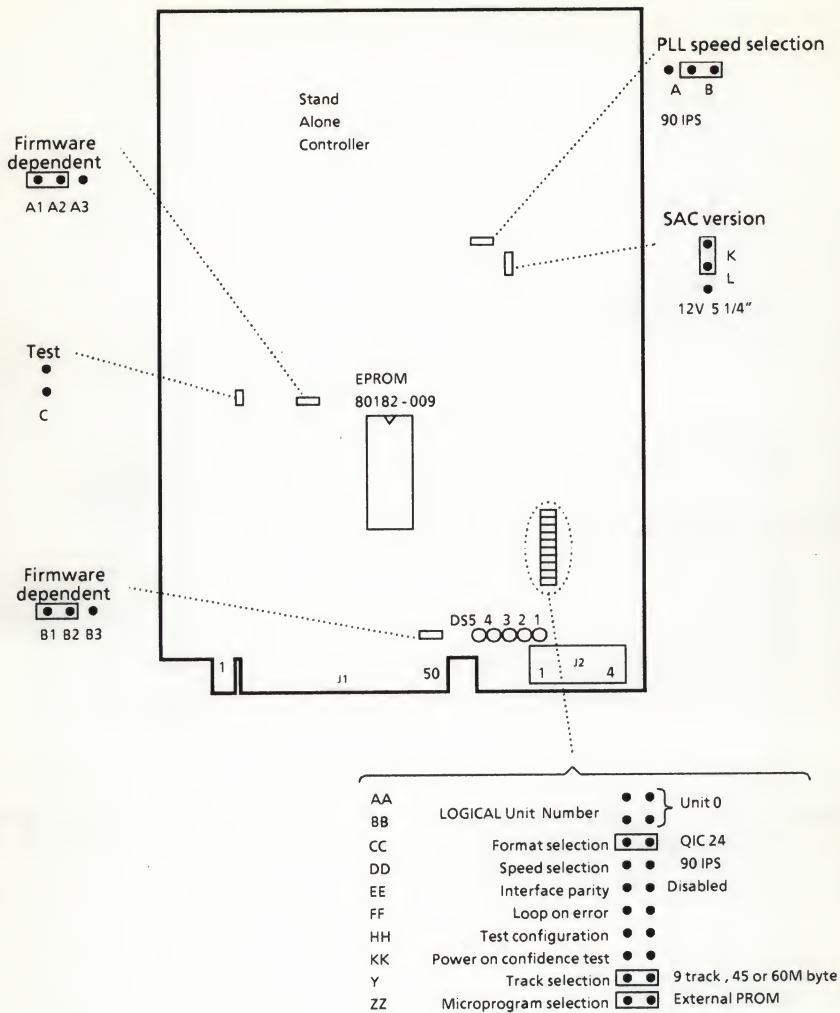




## 19.2.3 Strap Settings

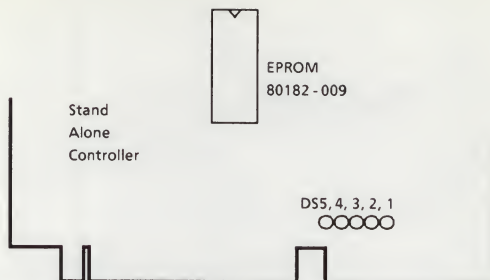
### Straps on the Stand Alone Controller (SAC)

| STRAPS                     | DESCRIPTION                                                                                                                                                                                                                                                         |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AA / BB                    | Logical Unit Number<br>AA / BB open = Unit 0 (default)<br>AA closed = Unit 1<br>BB closed = Unit 2<br>AA / BB closed = Unit 3 <div style="display: inline-block; vertical-align: middle; margin-left: 10px;">             } only 1 drive supported           </div> |
| CC                         | Format Selection<br>open = QIC 11<br>closed = QIC 24 (default)                                                                                                                                                                                                      |
| DD                         | Speed Selection<br>open = 90 IPS (default)<br>closed = 30 IPS                                                                                                                                                                                                       |
| EE                         | Interface Parity<br>open = Parity disabled (default)<br>closed = Parity enabled                                                                                                                                                                                     |
| FF                         | Loop on Error<br>open = default                                                                                                                                                                                                                                     |
| HH                         | Test Configuration<br>open = default                                                                                                                                                                                                                                |
| KK                         | Power -ON Confidence test<br>open = default                                                                                                                                                                                                                         |
| Y                          | Track Selection<br>open = 4 Track, 20 Mbyte<br>closed = 9 Track, 45 or 60 Mbyte (default)                                                                                                                                                                           |
| ZZ                         | Microprogram Selection<br>open = internal PROM<br>closed = external PROM (default)                                                                                                                                                                                  |
| A or B to common           | PLL Speed Selection<br>A to common = 30 IPS<br>B to common = 90 IPS (default)                                                                                                                                                                                       |
| K or L to common           | SAC Version<br>K to common = 12 Volt 5 1/4 " (default)<br>L to common = 24 Volt 8 "                                                                                                                                                                                 |
| A1, A2, A3 /<br>B1, B2, B3 | Firmware Dependent, factory set<br>A1 to A2 closed = default<br>B1 to B2 closed = default                                                                                                                                                                           |



**Note :** The strap KK must be set to see error codes via leds DS1 thr DS5  
A test that fails is looped.

## LED's on the SAC controller.



| LED'S | INDICATION OF ERROR CODE   | ERROR INDICATION | NORMAL OPERATION |
|-------|----------------------------|------------------|------------------|
| DS1   | LSI Controller chip error  | Flash            | Off              |
| DS2   | 16 KRAM buffer chip error  | Flash            | Off              |
| DS3   | Data Seperator logic error | Flash            | Off              |
| DS4   | 8155 (PIA) chip error      | Flash            | Off              |
| DS5   | Not used                   |                  | Off              |

**WARNING:** Do not change the straps at the rear of the drive!! (Workshop Set for optimal use in P9000 m systems).

## **19.2.4 Installation**

For the installation and positioning rules see chapter 2.

## **19.2.5 Maintenance**

The Streamer tape drive can be tested using the processor debugger and diagnostics, and the SSID tests.

### **Preventive maintenance**

Contact media devices requires periodic cleaning of the read / write head. Cleaning of the read/write heads is required:

- After initial pass of a new tape.
- After 2 hours tape movement of new tapes.
- After 8 hours of tape movement.
- After severe read/write errors.

The following cleaning solutions and materials are recommended:

- Cotton swabs, at least 6 inches long to reach the read/write head.
- IBM tape head cleaner, other solutions are not recommended, they may leave residue on the read/write head and so causing a faster built up dirt on the head.





## 19.3 MVME853 Archive 2150S

### 19.3.1 Characteristics

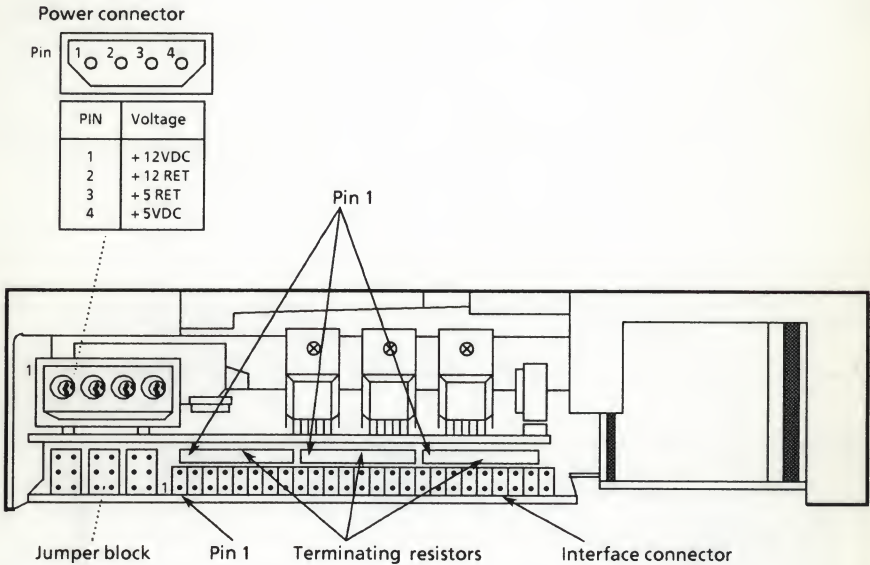
For the characteristics see section 19.1

### 19.3.2 Connections

For connections to a MVME147, see section 9.6.2 and 9.7.2.

For connections to a MVME327A, see section 12.5.2.

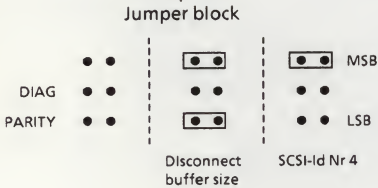
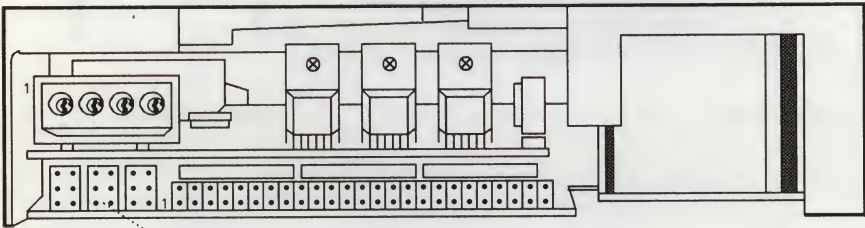
For connections to a MVME328-1/2, see section 12.6.2.



### 19.3.3 Strap Settings

Straps on the MVME853 controller board

| STRAPS             | SETTING                                   | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                           |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
|--------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------|----|----|----|----|----|----|----|-------------------------------------------|----|-----|----|-------------------------|----|-----|----|-----|
| DIAG.              | Open                                      | Diagnostic mode on/off<br>Open = Off (default)<br>Closed = On                                                                                                                                                                                                                                                                                                                         |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| PARITY             | Open                                      | parity check enable/disable<br>Open = Disable<br>Closed = Enabled                                                                                                                                                                                                                                                                                                                     |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| DISCONNECT<br>SIZE | Closed<br>Open<br>Closed                  | Disconnect size = max. number of bytes that can be<br>transferred over the SCSI bus during a single data phase                                                                                                                                                                                                                                                                        |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
|                    |                                           | <table><tr><th>Code</th><th>Disconnect Size</th></tr><tr><td>0H</td><td>2K</td></tr><tr><td>1H</td><td>4K</td></tr><tr><td>2H</td><td>6K</td></tr><tr><td>3H</td><td>8K (min. requirement for COPY<br/>command)</td></tr><tr><td>4H</td><td>12K</td></tr><tr><td>5H</td><td>16K (factory installed)</td></tr><tr><td>6H</td><td>24K</td></tr><tr><td>7H</td><td>32K</td></tr></table> | Code | Disconnect Size | 0H | 2K | 1H | 4K | 2H | 6K | 3H | 8K (min. requirement for COPY<br>command) | 4H | 12K | 5H | 16K (factory installed) | 6H | 24K | 7H | 32K |
| Code               | Disconnect Size                           |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 0H                 | 2K                                        |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 1H                 | 4K                                        |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 2H                 | 6K                                        |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 3H                 | 8K (min. requirement for COPY<br>command) |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 4H                 | 12K                                       |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 5H                 | 16K (factory installed)                   |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 6H                 | 24K                                       |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| 7H                 | 32K                                       |                                                                                                                                                                                                                                                                                                                                                                                       |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
|                    |                                           | OPEN = 0<br>CLOSED = 1                                                                                                                                                                                                                                                                                                                                                                |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |
| SCSI ID            | Closed<br>Open<br>Open } dev. 4           | Controller ID determines the priority of the controller<br>during the bus arbitration phase.<br>0 = lowest level, 7 = highest level                                                                                                                                                                                                                                                   |      |                 |    |    |    |    |    |    |    |                                           |    |     |    |                         |    |     |    |     |



### **19.3.4 Installation**

For the installation and positioning rules see chapter 2.

### **19.3.5 Maintenance**

The Streamer tape drive can be tested using the processor debugger and diagnostics, and the SSID tests.

#### **Preventive Maintenance**

Contact media devices requires periodic cleaning of the read / write head.

Cleaning of the read/write heads is required:

- After initial pass of a new tape.
- After 2 hours tape movement of new tapes.
- After 8 hours of tape movement.
- After severe read/write errors.

The following cleaning solutions and materials are recommended:

- Cotton swabs, at least 6 inches long to reach the read / write head.
- IBM tape head cleaner, other solutions are not recommended, they may leave residue on the read / write head and so causing a faster built up dirt on the head.



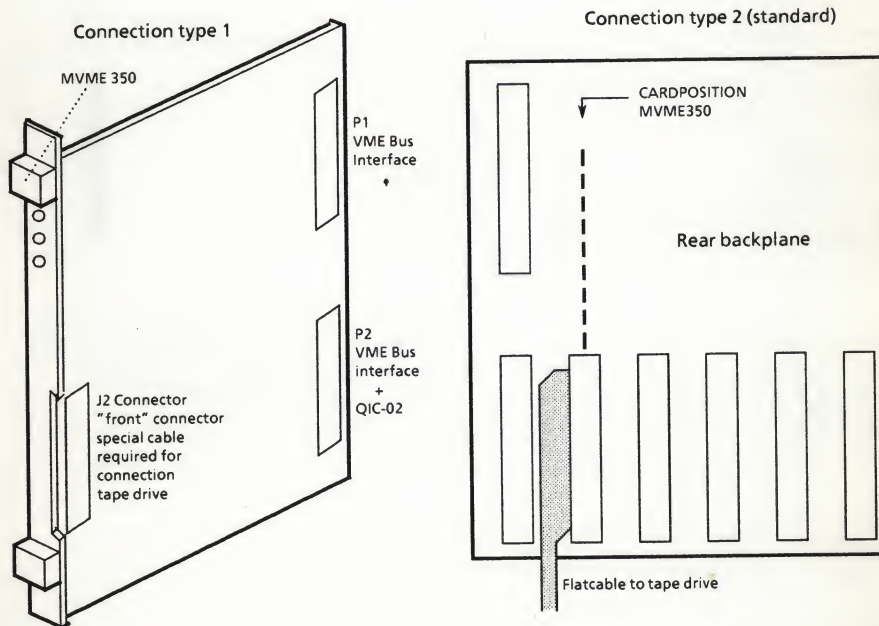
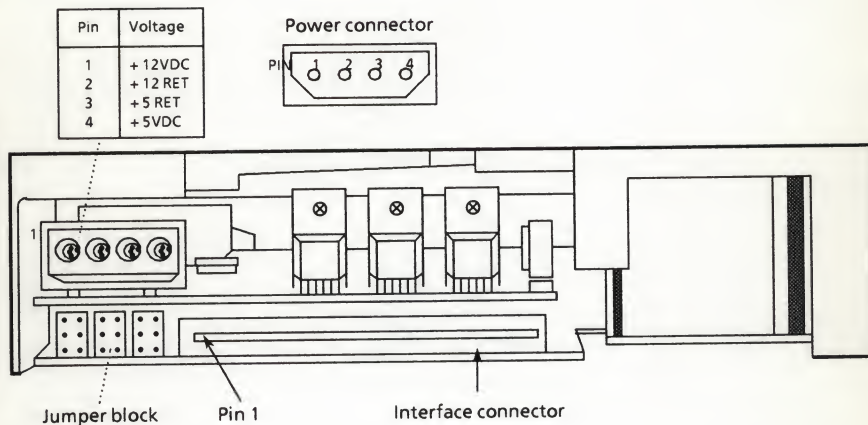


## 19.4 MVME853Q Archive 2150L

### 19.4.1 Characteristics

For the characteristics see section 19.1.

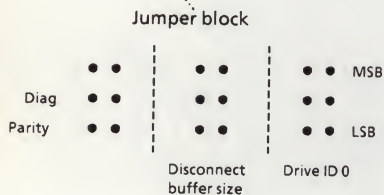
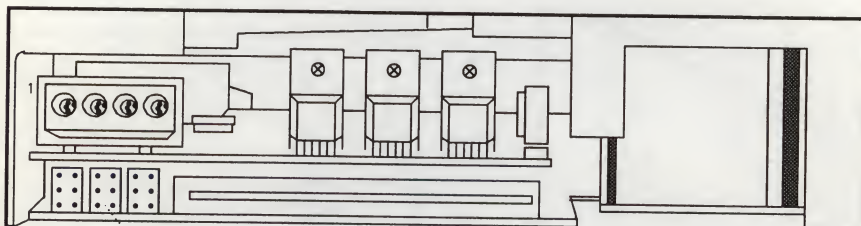
### 19.4.2 Connections



## 19.4.3 Strap Settings

Straps on the streamer controller board

| STRAPS          | SETTING                  | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Diag.           | Open                     | Diagnostic mode on/off<br>Open = Off (default)<br>Closed = On                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Parity          | Open                     | parity check enable/disable<br>Open = Disable<br>Closed = Enabled                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Disconnect size | Closed<br>Open<br>Closed | Disconnect size = max. number of bytes that can be transferred over the bus during a single data phase<br>Open = 0; closed 0 1<br><br><div> <b>Code    Disconnect Size</b><br/>           0H            2K<br/>           1H            4K<br/>           2H            6K<br/>           3H            8K    (min. requirement for COPY command)<br/>           4H            12K<br/>           5H            16K    (factory installed)<br/>           6H            24K<br/>           7H            32K         </div> |
| Drive ID        | Open<br>Open<br>Open     | Drive 0 is selected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



**CAUTION :** On certain Archive 2150L drives a strap is present for slow or fast speed. remove the drive, remove the main PCB and check that the strap situated behind RN1 is strapped to "FAST".

#### **19.4.4 Installation**

For the installation and positioning rules see chapter 2.

#### **19.4.5 Maintenance**

The Streamer tape drive can be tested using the processor debugger and diagnostics, and the SSID tests.

##### **Preventive maintenance**

Contact media devices requires periodic cleaning of the read / write head.

Cleaning of the read/write heads ~~is~~ required:

- After initial pass of a new tape.
- After 2 hours tape movement of new tapes.
- After 8 hours of tape movement.
- After severe read/write errors.

The following cleaning solutions and materials are recommended:

- Cotton swabs, at least 6 inches long to reach the read/write head.
- IBM tape head cleaner, other solutions are not recommended, they may leave residue on the read/write head and so causing a faster built up dirt on the head.





## 19.5 MVME854 Archive 2525S

### 19.5.2 Characteristics

For the characteristics see section 19.1

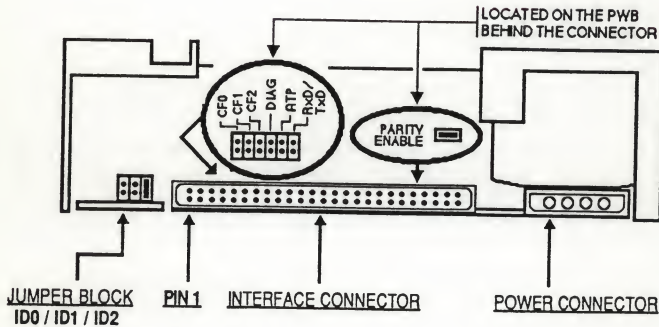
### 19.5.2 Connections

For connections to a MVME187 see section 9.7

For connections to a MVME328-1/2 see section 12.6.2.

### 19.5.3 Strap Settings

Straps on the MVME854 controller board



| STRAPS                               | SETTING                              | DESCRIPTION                                                                                                                                     |
|--------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| SCSI ID:<br>ID0<br>ID1<br>ID2        | Open<br>Open<br>Closed               | SCSI address selection, default strapped as device 4 (1st tape drive)                                                                           |
| PARITY<br>ENABLE                     | Closed                               | Parity check selection, CLOSED is enabled                                                                                                       |
| ATP                                  | Open                                 | Terminator power selection, OPEN is terminator power from Drive, CLOSED is terminator power supplied by SCSI bus                                |
| CF0<br>CF1<br>CF2<br>DIAG<br>RxD/TxD | Open<br>Open<br>Open<br>Open<br>Open | For diagnostic purposes<br>For diagnostic purposes<br>For diagnostic purposes<br>Diagnostic mode on/off, OPEN is off<br>For diagnostic purposes |

#### **19.5.4 Installation**

For the installation and positioning rules see chapter 2.

#### **19.5.5 Maintenance**

The Streamer tape drive can be tested using the processor debugger and diagnostics, and the SSID tests.

##### **Preventive Maintenance**

Contact media devices requires periodic cleaning of the read / write head.

Cleaning of the read/write heads is required:

- After initial pass of a new tape.
- After 2 hours tape movement of new tapes.
- After 8 hours of tape movement.
- After severe read/write errors.

The following cleaning solutions and materials are recommended:

- Cotton swabs, at least 6 inches long to reach the read / write head.
- IBM tape head cleaner, other solutions are not recommended, they may leave residue on the read / write head and so causing a faster built up dirt on the head.

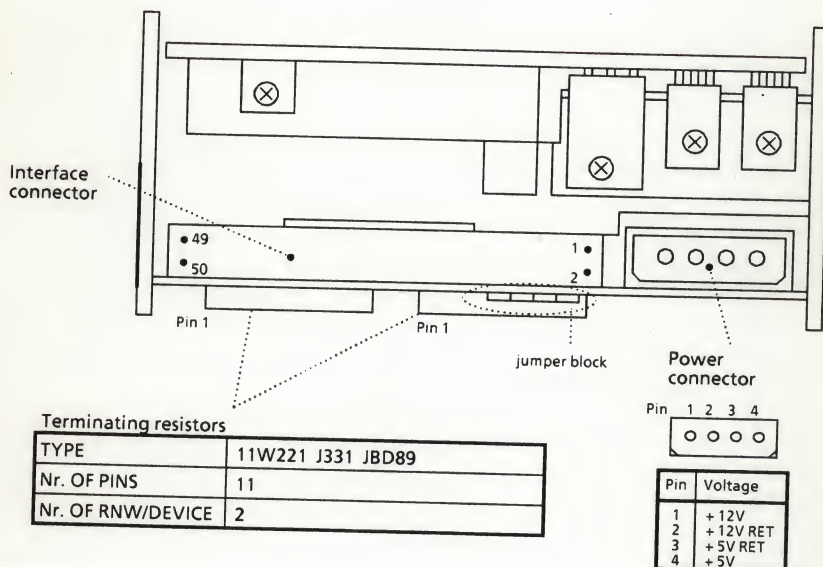
## 19.6 MVME855 TEAC-2ST/N50-00-U

### 19.6.1 Characteristics

For the characteristics see section 19.1.

### 19.6.2 Connections

For connections to the MVME147 processor modules, see the sections 9.6.2 and 9.7.2.

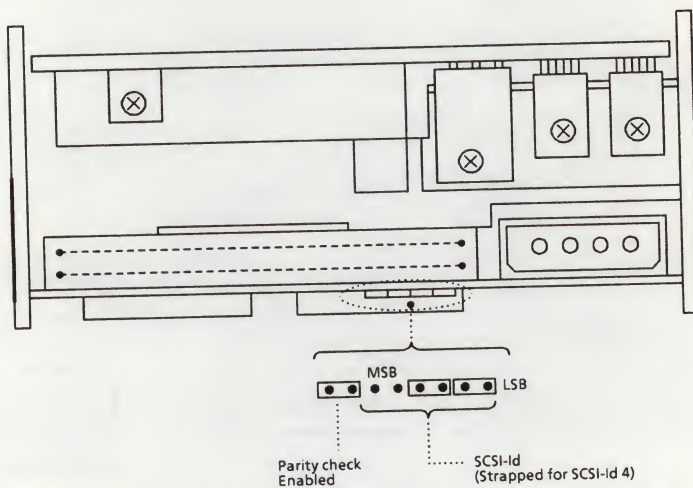




## 19.6.3 Strap Setting TEAC-2ST/N50-00-U SCSI

Straps on the controller

| STRAPS        | SETTING                  | DESCRIPTION                                                                                                                                                   |
|---------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parity check. | Closed                   | Parity enable/disable<br>Open = Disable<br>Closed = Enable                                                                                                    |
| SCSI - Id     | Open<br>Closed<br>Closed | Controller ID determines the priority of the controller during the bus arbitration phase.<br>0 = lowest level 7 = highest level<br>Open = '1'<br>Closed = '0' |



#### **19.6.4 Installation**

For the installation and positioning rules see chapter 2.

#### **19.6.5 Maintenance**

The TEAC Streamer tape drive can be tested using the processor debugger and diagnostics, and the SSID tests.

##### **Preventive Maintenance**

Contact media devices require periodic cleaning of the read / write heads.

The recommended frequency to clean the head is once per month or per 200 passes (that is 200 times wind and rewind) .

The following cleaning solutions and materials are recommended:

- Cotton swabs, at least 6 inches long to reach the read/write head.
- IBM tape head cleaner, other solutions are not recommended, they may leave residue on the read/write head and so causing a faster built up dirt on the head.



## 19.7 MVME856 EXA Byte EXB-8200

### 19.7.1 Characteristics

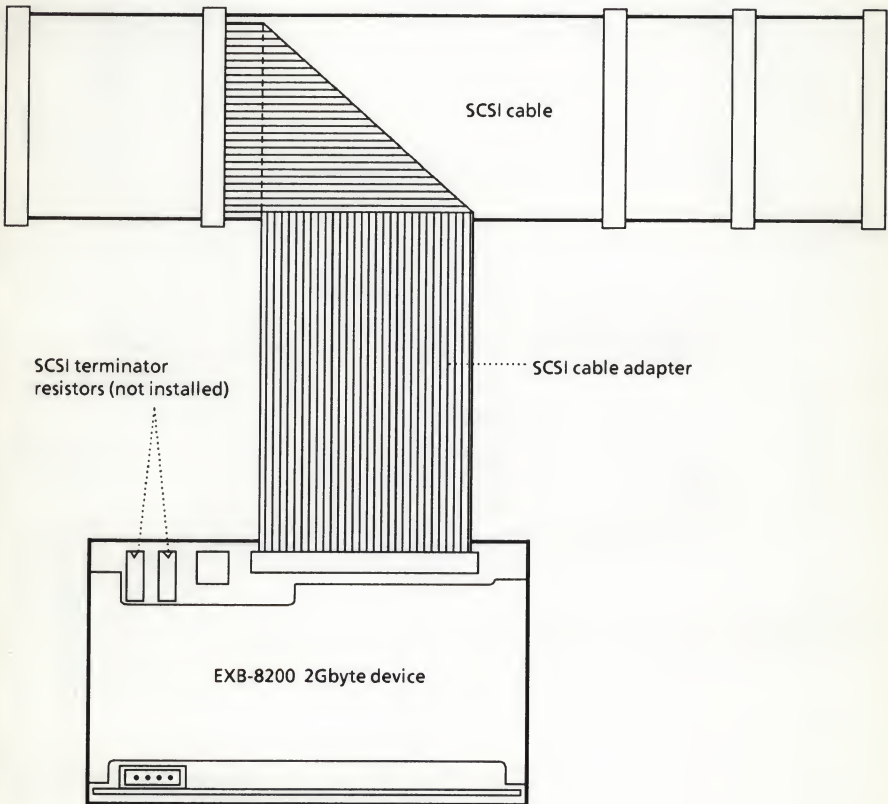
For the characteristics see section 19.1.

### 19.7.2 Connections

For connections to a MVME147, see sections 9.6.2 and 9.7.2.

For connections to a MVME327A, see section 12.5.2.

For connections to a MVME328-1/2, see section 12.6.2.

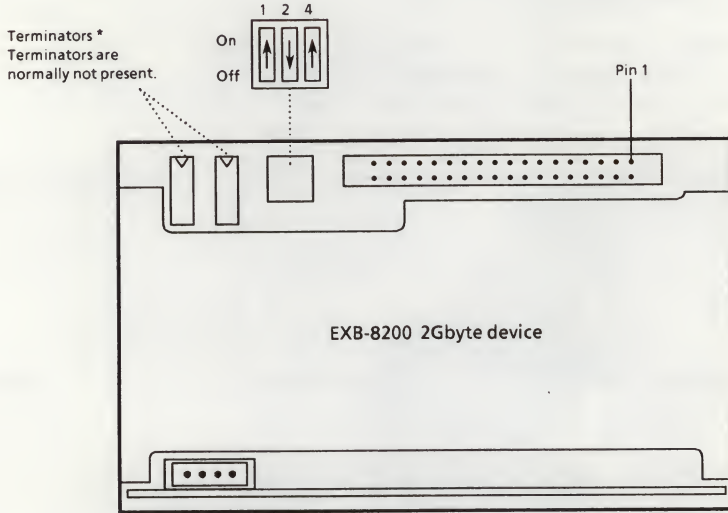




### 19.7.3 Strap Settings

The only strap setting necessary is the SCSI ID. This strapsetting is done with 3 switches at the rear of the drive.

The SCSI-ID is normally 5, resulting in the following switch setting.



\* Terminating resistors MVME856

|                   |                         |
|-------------------|-------------------------|
| Type              | 8X-4-221/331 (220/330Ω) |
| Nr. of pins       | 8 (SIP)                 |
| Nr. of RNW/DEVICE | 3                       |

\* The begin and the end of the SCSI bus must be terminated.

### Straps/switches on the MX card

The second card from the rear is the MX card, this card contains some straps or, depending on the revision, some switches. These straps or switches are factory setted, so no rework is necessary.

The meaning of these straps/switches is (default strapping is marked):

| Straps                 | Switch S1     | Meaning                                                                                  |
|------------------------|---------------|------------------------------------------------------------------------------------------|
| J1 L to M<br>J1 M to R | 1 On<br>1 Off | Bypass memory test on power-on reset<br>Run memory test on power-on reset <b>default</b> |
| J2 L to M<br>J2 M to R | 2 On<br>2 Off | Parity checking enabled<br>Parity checking disabled <b>default</b>                       |
| J3 L to M<br>J3 M to R | 3 On<br>3 Off | Even byte disconnect<br>Odd or even byte disconnect <b>default</b>                       |
| J4 L to M<br>J4 M to R | 4 On<br>4 Off | No busy enable<br>Report busy status <b>default</b>                                      |
| J8 M to R<br>J8 L to M | 5 On<br>5 Off | Variable block mode on power up<br>Fixed block mode on power up <b>default</b>           |
| J7 M to R<br>J7 L to M | 6 On<br>6 Off | No disconnect during data transfer<br>Normal data operations <b>default</b>              |
| J6 L to M<br>J6 M to R | 7 On<br>7 Off | Reserved for future use<br>Reserved for future use <b>default</b>                        |
| J5 M to R<br>J5 L to M | 8 On<br>8 Off | P1 cartridge mode is international<br>P6 cartridge mode is domestic <b>default</b>       |

## 19.7.4 Installation

For the installation and positioning rules see also chapter 2.

1. Connect the SCSI adaptor cable assembly to the SCSI connector on the 2Gb drive. In case a P9070 a special cable (30-W2233C03A) is required, in case a P9090 a special cable (30-W2233C0SA) is required.
2. It will be necessary to remove the drive mounting brackets from the system. Do this by loosening the four screws holding the brackets into place. Gently pull the brackets out. If there is already a drive installed in the brackets, remove its power and data cable.
3. Remove the drive filler panel(s) from the appropriate position(s). Install the new tape drive in the proper position and secure with the four screws (P/N 03SW990F604) provided with the kit. Gently slide the new drive assembly back into the drive slot until the drive mounting bracket flanges contact the flanges in the drive assembly. Tighten the mounting screws on either side of the drive mounting brackets.

4. Reinstall any cables that were removed in Step "2".
5. Attach the SCSI cable to the connector or the SCSI cable adapter on the drive; locate the red, blue or dark grey stripe on the cable, towards the left of the system (as viewed from the back of the drive).
6. Connect one end of the power distribution cable (P/N 30-W2197C01) into the power connector on the new drive.
7. Connect the other end of the power distribution cable into the power distribution board.

## **19.7.5 Maintenance**

The Streamer Tape Drive can be tested using the processor debugger and diagnostics, and the SSID tests can be used.

### **Preventive Maintenance**

Regular cleaning of the tape device has proven to be fundamental in obtaining maximum performance in all application conditions. This is a user activity and consists of cleaning the tape path.

It is recommended to clean the tape device every 30 hours of tape motion which translates into approximately every 30/60 gigabytes of data transfer. Drives will remain clean and there are no negative side effects with such a cleaning program.

It should be noted that this is a preventative program; if drives are allowed to become dirty, use of the cleaning cartridge may not fully restore tape devices to the clean state.

Cleaning should only be performed with the help of the Philips Cleaning Cartridge (8709 004 13601).

Note that the cleaning cartridge is designed for twelve uses and then disposed. The cleaning cartridge should never be rewinded or re-used as the change of re-introducing contaminants is very high.

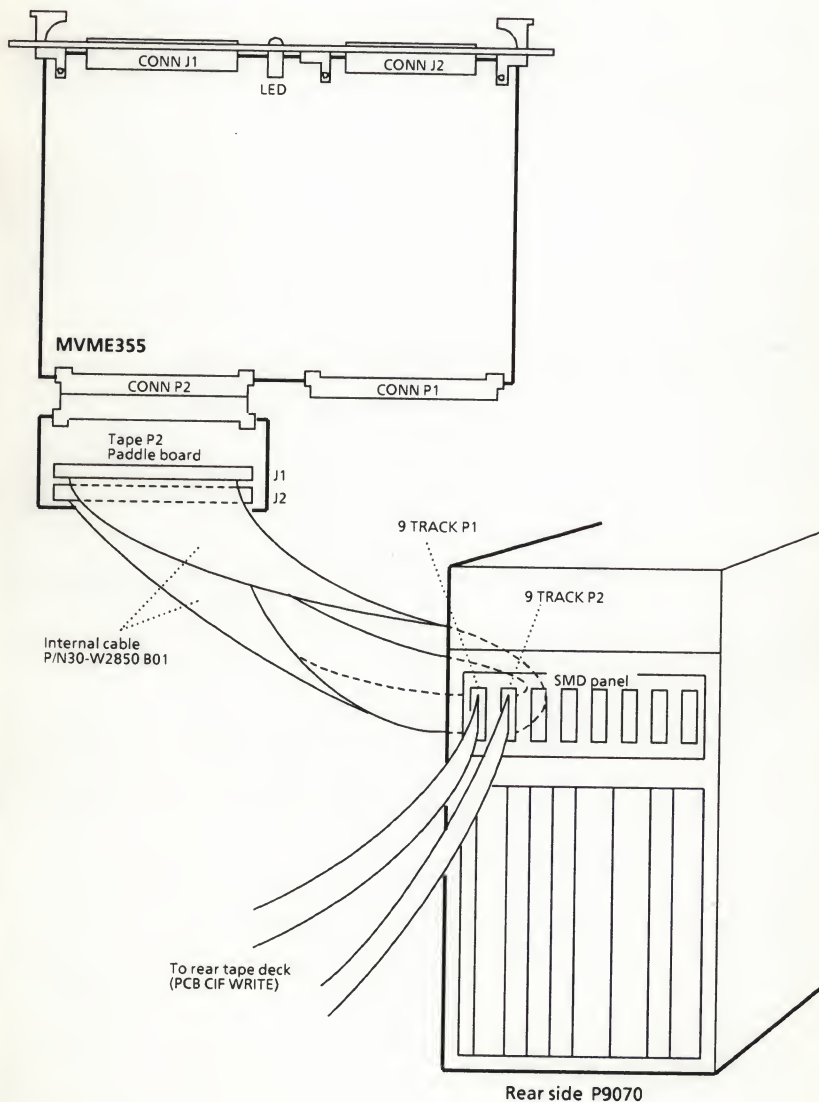
Never use the commercially available video cleaning cartridges. These cartridges contain material that is highly abrasive to recording heads. The tape drive may be permanently damaged after only a few cleanings with an abrasive type cleaning cartridge.

## 19.8 P3544-001 CIPHER M890/M891

### 19.8.1 Characteristics

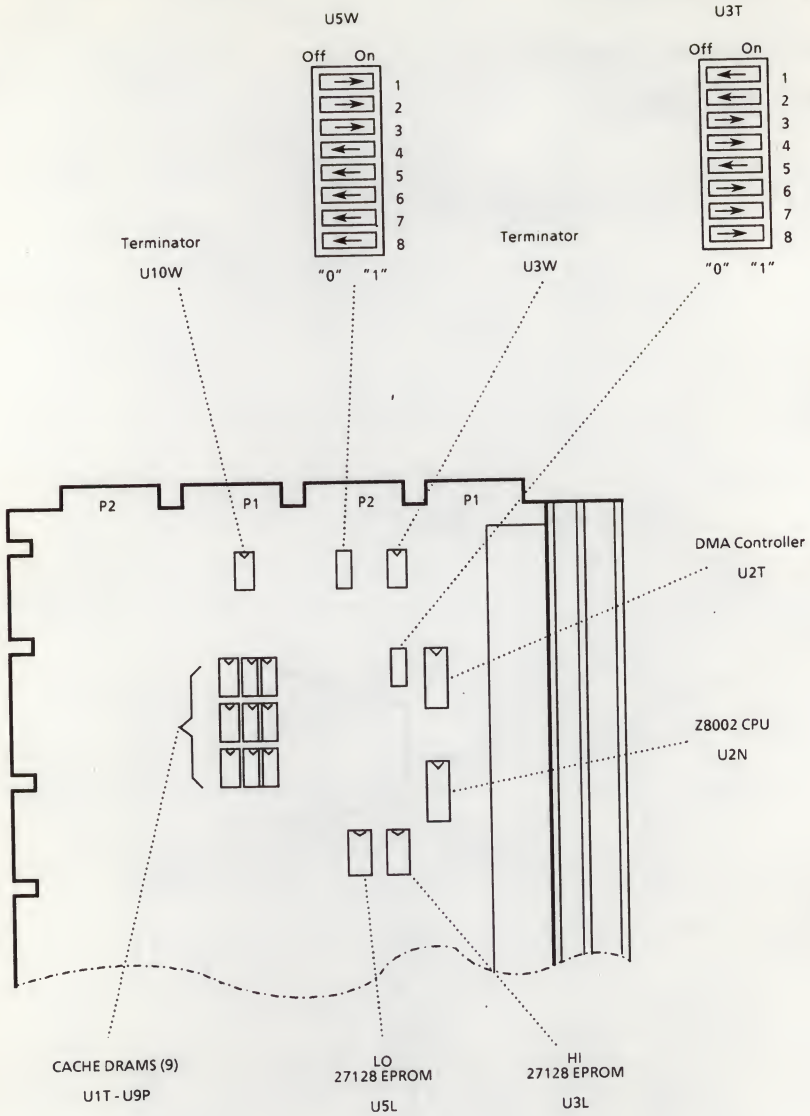
For the characteristics, see section 19.1.

### 19.8.2 Connections





# 19.8.3 Strap Settings



| SWITCH | POSITION |     | FUNCTION                                                                  |                                |     |
|--------|----------|-----|---------------------------------------------------------------------------|--------------------------------|-----|
| U3T    | 1        | OFF | EOT LOCATION disabled<br>Internal Parity enabled                          |                                |     |
|        | 2        | OFF |                                                                           |                                |     |
|        | 3        | 4   | Select max. block size<br>9K Bytes<br>16K Bytes<br>24K Bytes<br>32K Bytes |                                |     |
|        | Off      | Off |                                                                           |                                |     |
|        | On       | Off |                                                                           |                                |     |
|        | Off      | On  |                                                                           |                                |     |
|        | On       | On  | Not Used                                                                  |                                |     |
|        | 5        | OFF |                                                                           |                                |     |
|        | 6        | 7   | 8                                                                         | Selected<br>Simulated<br>Speed |     |
|        | Off      | Off | Off                                                                       |                                |     |
|        | On       | Off | Off                                                                       | 12.5                           | 20  |
|        | Off      | On  | Off                                                                       | 25                             | 40  |
|        | On       | On  | Off                                                                       | 37.5                           | 60  |
|        | Off      | Off | On                                                                        | 45                             | 72  |
|        | On       | Off | On                                                                        | 75                             | 120 |
|        | On       | Off | On                                                                        | 75                             | 120 |
|        | Off      | On  | On                                                                        | 75                             | 120 |
|        | On       | On  | On                                                                        | 75                             | 120 |
|        | Off      | Off | Off                                                                       | 12.5                           | 30  |
|        | On       | Off | Off                                                                       | 25                             | 15  |
|        | Off      | On  | Off                                                                       | 37.5                           | 10  |
|        | On       | On  | Off                                                                       | 45                             | 8.3 |
|        | Off      | Off | On                                                                        | 75                             | 5.0 |
|        | On       | Off | On                                                                        | 75                             | 5.0 |
|        | Off      | On  | On                                                                        | 75                             | 5.0 |
|        | On       | On  | On                                                                        | 75                             | 5.0 |

| SWITCH | POSITION   |            |           | FUNCTION                                                                                           |  |
|--------|------------|------------|-----------|----------------------------------------------------------------------------------------------------|--|
| U5W    | 1<br>TAD0* | 2<br>TAD1* | 3<br>FAD* | Unit Address Select<br><br>FAD0* 0 (default)<br>1<br>2<br>3                                        |  |
|        | On         | On         | On        |                                                                                                    |  |
|        | On         | Off        | On        |                                                                                                    |  |
|        | Off        | On         | On        |                                                                                                    |  |
|        | Off        | Off        | On        | FAD1* 4<br>5<br>6<br>7                                                                             |  |
|        | Off        | Off        | Off       |                                                                                                    |  |
|        | Off        | On         | Off       |                                                                                                    |  |
|        | Off        | Off        | Off       |                                                                                                    |  |
|        | 4          | On         |           | Streaming EOT and DOUBLE FILEMARK disabled<br>Streaming EOT and DOUBLE FILEMARK disabled (default) |  |
|        | 4          | Off        |           |                                                                                                    |  |
|        | 5          | On         |           | 3200 BPI IDENT enabled<br>3200 BPI IDENT disabled (default)                                        |  |
|        | 5          | Off        |           |                                                                                                    |  |
|        |            | 6-8        |           | Not used                                                                                           |  |

## Software strapping

When using the tape unit for the back-up and restore utility "br" and in the application VISION or LIFE-works some software setting is required. For the utility "br" this must be done in the file /backups/files/ArchiveLib. In this file there are declarations for the known back-up and restore devices. Change the lines for the 9-track tape unit into:

- 9-track (2400-foot) /dev/rmt/m355\_0 -b 9k -s 36M -p
- 9-track (3600-foot) /dev/rmt/m355\_0 -b 9k -s 66M -p

For the application "vision" and for LIFE-works you must change the file /etc/brutab. This file contains loadable information. Change the declarations for the 9-track 1600 bpi, 2400ft (nominally 2000ft) tape entry. The declarations for the buffer size must be "bufsize = 9k". In case 3600ft tape reels also "bufsize = 9k").

## 19.8.4 Installation

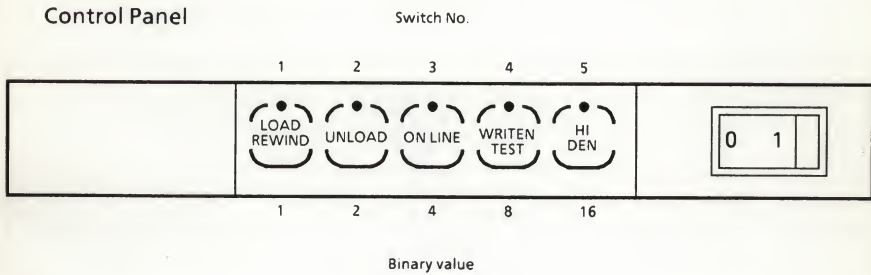
### Tape Drive

1. Standard the tape drive is delivered as a table top drive. So no mounting rails are to be used.
2. Open the table top housing by lifting the upper half of it.
3. Open the top cover by lifting sides directly behind the front panel.  
Place cover stay (left rear of the top cover) in the slot provided.  
Pull tachometer (spring loaded arm at left rear of unit) away from hub and discard the foam cushion. Carefully replace tachometer assembly against hub.
4. Examine the tape path area and other components for foreign matter.  
Remove foreign matter if present.
5. Close the top cover.
6. Using a screwdriver, loosen the two captive screws at front sides.  
Lift the front panel (and top plate casting) by grasping the two lower corners of the front panels. Lift the unit to its maximum upright position.  
Insert the safety pin into the latch mechanism. See figure.
7. Remove three pieces of foam packing material from the printed circuit board.  
Check the board and all connectors for correct installation.
8. Set the switches U3T and U5W. (See section 19.8.2 for switch setting).
9. Close the tape unit, take away the safety pin. To release the latch mechanism, lift up the unit by the front panel and press against the latching mechanism.
10. Open the top cover and tighten the two captive screws. Close the top cover and table top housing.
11. Check that the operating voltage indicated on the manufacturers label at the rear of the chassis matches the power outlet of the unit.  
If not, change the operating voltage; see therefore the CIPHER Service Manual Volume 1, OPERATION AND MAINTENANCE, section 1.4.
12. Connect the two interface cables to the plugs at the rear of the P9000m cabinet.
13. Connect the power cord.
14. Switch on the power to the tape drive.
15. Load a scratch tape.
16. Activate the selftest of the tape drive, see the CIPHER Service Manual Volume 1, section 3. In case of problems, start trouble shooting.  
When there are no problems, start-up the system and run the tape diagnostic.

## Operation

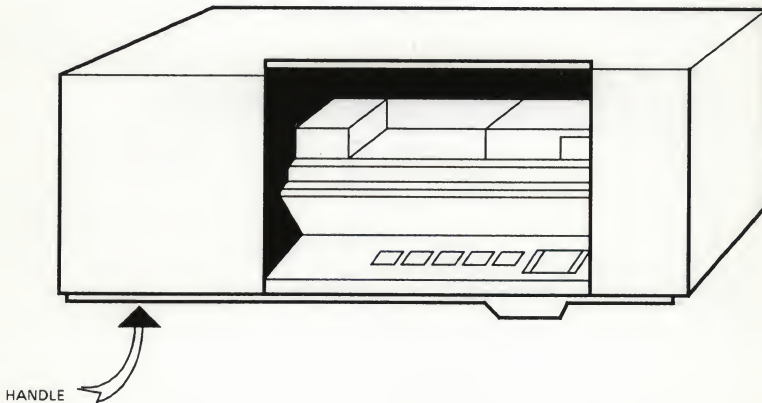
A picture of the control panel and how to open the drive is shown below:

**Warning:** Do not try to pent the front door when drive is operating,  
It can easily be damaged !



### Opening the Drive:

1. Switch the power off.
2. Squeeze the handle on the bottom left-hand side (on the inside) of the front panel to release the catch that locks the drive in the cabinet.
3. Pull the drive out of the cabinet and open the top cover. Set the supporting rod on the left to keep the cover open.





## Function of the Frontpanel Switches

| CONTROL INDICATOR     | TYPE                               | FUNCTION                                                                                                                                                                                                                       | CONDITIONS                                                                                                                                         |
|-----------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Power                 | On Off Rocker Switch and Indicator | Switch Line power on and off                                                                                                                                                                                                   | Fuse installed. Line cord connected.                                                                                                               |
| Load Rewind           | Tactile Switch and Indicator       | Loads tape to BOT marker.<br><br>Rewinds tape to BOT marker. Illuminates to indicated BOT tab is logically positioned at photosensor. When flashing, transport is executing a load or a rewind sequence.                       | Tape inserted in front panel door. Top cover and front panel door closed.<br><br>Transport in off-line mode (ON-LINE indicator extinguished).      |
| Unload                | Tactile Switch and Indicator       | Unloads tape from any point. UNLOAD indicator flashes during unload sequence, then remains illuminated.                                                                                                                        | Transport in off-line mode (ON-LINE indicator extinguished).                                                                                       |
| On-Line               | Tactile Switch and Indicator       | Switches transport to on-line mode. Illuminates to indicate transport is on-line.<br><br>Second actuation switches transport off-line (must be off-line to unload). Indicator extinguished to indicate transport is off-line.  | Tape loaded and transport in off-line mode (ON-LINE indicator extinguished).<br><br>Transport is in on-line mode. (ON-LINE Indicator illuminated). |
| Test                  | Tactile Switch                     | Selects alternate operational mode for other switches.                                                                                                                                                                         | Refer to paragraphs 3-6 and 3-9.                                                                                                                   |
| WRT EN (Write Enable) | Indicator                          | Illuminates to indicate write function may be performed.                                                                                                                                                                       | Tape reel write-enable ring installed mounted on supply hub and tape loaded. Ring is removed for Write protect.                                    |
| HI DEN                | Tactile Switch and Indicator       | First actuation (indicator illuminated): high density mode, 3200 CPI.<br><br>Second actuation (indicator extinguished): lower density mode, 1600 CPI.<br><br>Indicator also reflects the density selected via the I/O command. | 3200 CPI transport must be in off-line mode (ON-LINE indicator extinguished).                                                                      |



## Manual Load/Unload

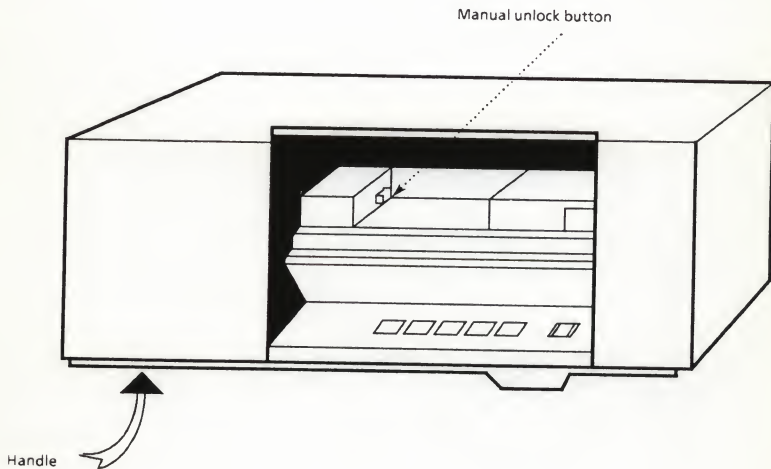
The CIPHER tape drive is equipped with an auto-load facility but a manual load/unload can be performed in the next procedure.

### Loading a Tape Manually

If the tape drive has been unable to load the tape automatically, you may have to load it manually.

To do this take the following steps:

1. Open the drive.
2. Put the tape reel on the hub.  
Be sure that cover stay is locked !
3. Press the manual unlock button, which is behind the front panel on the bottom left-hand side, and keep pressing.

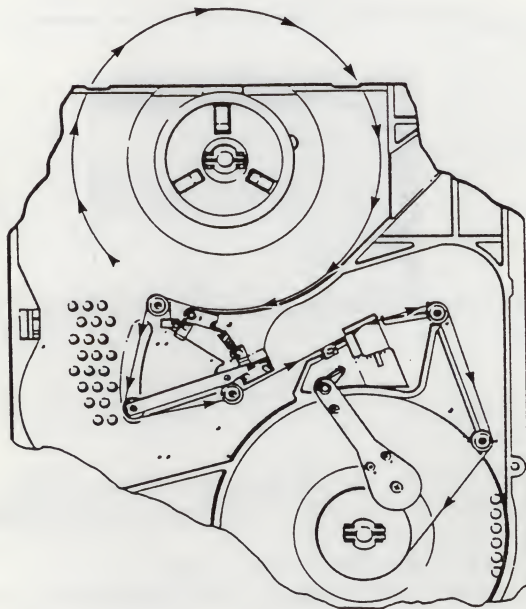


4. With your other hand, pressing down the tape reel evenly and firmly, rotate the reel and hub clockwise. When you feel resistance in the hub, turn the reel a little further until you feel it locked in place.
5. Thread the tape along the path shown in the illustration.
6. Gently swing the arm away from the take-up hub. Then wrap the tape once around the take-up hub and move the arm back into place.
7. The tape needs to be well wrapped around the take-up hub, so turn the hub at least five times, clockwise.
8. Check that the tape is correctly seated on the guides and over the head assembly.
9. Close the top cover.

10. Press the Hi Den and Load Buttons at the same time. The tape will be wound forwards to its load point. The Load lamp should now be lit, indicating that the tape is ready for use.

### Unloading a Tape Manually

1. Open the drive.
2. Turn the tape reel anti-clockwise until all the tape is wound onto the reel.
3. Press the manual unlock button, and keep pressing it while you rotate the tape reel and hub anti-clockwise until the tape reel rotates freely, and can be removed from the hub.



## 19.8.5 Maintenance

### Diagnostics

1. Power-up selftest (PUST).
2. Errors during operation.
3. Service aid (testprograms).

### Selftest

A selftest (PUST) is performed automatically after power-on. If a fault is found, a fault code will be displayed on the control panel. In case a fault code consists of more than one level, you can display the next level by pressing LOAD.

The codes are listed in the tables below:

If all LEDS are flashing at the same time, the bus or the microprocessor is blocked.

| PUST TEST | FAILURE                                      | LEVEL 1 DISPLAY | LEVEL 2 DISPLAY                           | REMARKS                                                                                                                          |
|-----------|----------------------------------------------|-----------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1         | Low ROM (U5L)                                | 1 0 0 0 0       | --                                        | Checksum error                                                                                                                   |
| 2         | High ROM (U3L)                               | 0 1 0 0 0       | --                                        | Checksum error                                                                                                                   |
| 3         | Low RAM (U5N)                                | 1 1 0 0 0       | --                                        | Checksum error                                                                                                                   |
| 4         | High RAM (U3N)                               | 0 0 1 0 0       | --                                        | Checksum error                                                                                                                   |
| 5         | CIO TEST<br>CIO - Z1<br>CIO - Z2<br>CIO - Z3 | 1 0 1 0 0       | --<br>0 0 0 1 0<br>0 0 0 0 1<br>0 0 0 1 1 | Press LOAD<br>IC-U9L fails<br>IC-U11L fails<br>IC-U13L fails                                                                     |
| 6         | Eearly Test Exit                             | 0 1 1 0 0       |                                           | Generally indicates a failure in tests 1 through 5, above. Tests for early PUST exit when TEST pressed and held during power-up. |

| LEVEL 1 DISPLAY | LEVEL 2 LOW HIGH | LEVEL 3 LOW HIGH                                                        | LEVEL 4 LOW HIGH                                                                                                     | LEVEL 5 LOW HIGH           | REASON                                                                                                     |
|-----------------|------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------|
| 11100           |                  |                                                                         |                                                                                                                      |                            | DMA/Cache circuits                                                                                         |
|                 | 10000 00001      |                                                                         |                                                                                                                      |                            | DMA failure                                                                                                |
|                 |                  | 10000 00001<br>01000 00001<br>11000 00001<br>00100 00001<br>10100 00001 |                                                                                                                      |                            | Base address error<br>Word count error<br>No count rollover<br>Addition not 0<br>No terminal count         |
|                 | 01000 00001      |                                                                         |                                                                                                                      |                            | Cache RAM circuits                                                                                         |
|                 |                  | 10000 00001<br>01000 00001                                              |                                                                                                                      |                            | Address error (low to high)<br>Address error (high to low)                                                 |
|                 |                  |                                                                         | 10000 00001<br>01000 00001<br>00100 00001<br>00100 00001<br>00000 10001<br>00000 01001<br>00000 00101<br>00000 00011 |                            | RD7 - U10T<br>RD6 - U11R<br>RD5 - U11T<br>RD4 - U9P<br>RD3 - U9R<br>RD2 - U10P<br>RD1 - U11P<br>RD0 - U10R |
|                 |                  |                                                                         |                                                                                                                      | 10000 00001<br>01000 00001 | Read parity error (U91)<br>Write parity error (U91)                                                        |

| PUST TEST | LEVEL 1 DISPLAY | LEVEL 2 BYTE    |           | REASON                                  |
|-----------|-----------------|-----------------|-----------|-----------------------------------------|
|           |                 | LOW             | HIGH      |                                         |
| 8         | 0 0 0 1 0       |                 |           | CIO initialisation failure              |
| 9         | 1 0 0 1 0       |                 |           | DAC/ADC test failed                     |
|           |                 | 1 0 1 0 0       | 0 0 0 0 1 | DAC failed auto-zero                    |
|           |                 | 0 1 0 0 0       | 0 0 0 0 1 | Reference voltage (VINS) error          |
| 10        | 0 1 0 1 0       |                 |           | Servo motor test failed                 |
|           |                 | 1 0 0 0 0       | 0 0 0 0 1 | Unexpected drive voltage                |
|           |                 | 0 1 0 0 0       | 0 0 0 0 1 | Unexpected EMF on supply motor          |
|           |                 | 1 1 0 0 0       | 0 0 0 0 1 | Unexpected EMF on take-up motor         |
|           |                 | 0 0 1 0 0       | 0 0 0 0 1 | Take-up motor EMF out of tolerance      |
|           |                 | 1 0 1 0 0       | 0 0 0 0 1 | Take-up motor rotation out of tolerance |
| 11        | 1 1 0 1 0       |                 |           | Tachometer test failed                  |
|           |                 | 1 0 0 0 0       | 0 0 0 0 1 | Either of the two phases missing        |
|           |                 | or<br>0 1 0 0 0 | 0 0 0 0 1 |                                         |
|           |                 | 1 1 0 0 0       | 0 0 0 0 1 | Both phases missing                     |
|           |                 | 0 0 1 0 0       | 0 0 0 0 1 | Phase separation out of tolerance       |
| 13        | 1 0 1 1 0       |                 |           | Compliance arm voltage not in tolerance |
|           |                 | 1 0 0 0 0       | 0 0 0 0 1 | Reset voltage too low                   |
|           |                 | 0 1 0 0 0       | 0 0 0 0 1 | Reference voltage (VIN6) error          |



## Errors During Operation

During operation 4 kind of errors may occur:

- 1 Hard errors : may cause media damage if tape and servo's are not stopped.
- 2 MED1 errors : represent machine failures that could result in data corruption.
- 3 MED2 errors : represent illegal operation or faulty media.
- 4 Soft errors : represent operator related errors, usually during loading.

The codes are listed in the tables below:

| ERROR CODE NUMBER | BINARY DISPLAY | CONDITIONS                                                                                | ACTION                                                                                                                                                                                                    |
|-------------------|----------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4                 | 0 0 1 0 0      | Compliance arm circuit voltage level is out of tolerance during the autoloading sequence. | 1. Ensure that tape is properly wrapped around take-up hub.<br>2. Check compliance arm operation with Service Aid 24.                                                                                     |
| 9                 | 1 0 0 1 0      | Indicates that take-up hub cleaning is necessary.                                         | 1. Cycle power.<br>2. Call technician.                                                                                                                                                                    |
| 12                | 0 0 1 1 0      | Indicates that tape is still in path.                                                     | 1. Run Service Aid 21.                                                                                                                                                                                    |
| 17                | 1 0 0 0 1      | The compliance arm exceeded its travel limits during normal operation.                    | 1. If unit missed EOT or BOT and tape ran off reel, check EOT/BOT circuit with Service Aid 32.<br>2. Check compliance arm operation with Service Aid 24.<br>3. Check servo operation with Service Aid 11. |

## Method for Hard Error Recovery/Action

| INTERFACE                                      | RESULT WHEN UNIT IS OFF-LINE                                     | RESULT WHEN UNIT IS ON-LINE                                                                                    | OPERATOR ACTION       |
|------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------|
| IHER is latched and the tape remains tensioned | Front panel LED's are flashing and all switches are inoperative. | The flashing front panel LED's allows:<br>read data recovery, read extended status before the power is cycled. | Cycle power to reset. |



| ERROR CODE NUMBER | BINARY DISPLAY | CONDITIONS                                                                                                       | ACTION                                                                                                                                 |
|-------------------|----------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 5                 | 1 0 1 0 0      | Sequence error read forward internal status self-check fault.                                                    |                                                                                                                                        |
| 8                 | 0 0 1 0 0      | Unexpected done status in structure internal status self-check fault.                                            | 1. Note host command sequence: operating system program, version, release etc.<br>2. Contact factory.                                  |
| 13                | 1 0 1 1 0      | Illegal status found in structure. Internal status self-check fault.                                             |                                                                                                                                        |
| 16                | 0 0 0 0 1      | Sequence error: read reverse internal status self-check fault.                                                   |                                                                                                                                        |
| 18                | 0 1 0 0 1      | Tape speed variation in excess of the ANSI maximum of $\pm 10\%$ .                                               | 1. Check servo operation with Service Aid 11.<br>2. Check tachometer operation using Service Aid 11.                                   |
| 20                | 0 0 1 0 1      | DMA failure. Word count not at 0 after timeout.                                                                  | 1. Verify that PUST test 7 is successfully completed.<br>2. Check DMA and cache address/data lines using Service Aid 42.               |
| 23                | 1 1 1 0 1      | Reel seat/file-protect sensor failure during manual load.                                                        | 1. Check if file-protect or hub seat sensor are working properly.                                                                      |
| 24                | 0 0 0 1 1      | Parity error during Cache RAM refresh cycle. Generally, host cannot sustain throughput at present speed setting. | 1. Check for "soft" RAM fault: cycle power to force power-up check.<br>2. Check cache RAM with PUST test 7.<br>3. Re-run host program. |

## Method for Medium I Error Recovery/Action

| INTERFACE                                       | RESULT WHEN UNIT IS OFF-LINE                                  | RESULT WHEN UNIT IS ON-LINE                                                                                                                                | OPERATOR ACTION       |
|-------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| IHER is latched and the tape remains tensioned. | Front panel LED's are flashing; all switches are inoperative. | The flashing front panel LED's allows:<br>rewind from host, or<br>rewind/unload from host, read data recovery from cache prior to rewind, extended status. | Cycle power to reset. |

## Medium I Error Code Definitions

| ERROR CODE NUMBER | BINARY DISPLAY | CONDITIONS                                             | ACTION                                                                                                                                                                                                                      |
|-------------------|----------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3                 | 1 1 0 0 0      | The CTU detected more than 3700 feet of tape.          | 1. Try a different reel.                                                                                                                                                                                                    |
| 10                | 0 1 0 1 0      | Write Edit failure                                     | 1. New block size greater than original.<br>2. Re-check block size.                                                                                                                                                         |
| 11                | 1 0 0 1 0      | The number of write retries exceeded 16.               | 1. Try a different tape.<br>2. Check write circuits using Service Aids 12 (no tape in unit) or 23 (tape loaded).<br>3. Check read circuits using Service Aid 23 (tape loaded).                                              |
| 14                | 0 1 1 1 0      | Tape travel beyond the EOT marker exceeded 18 feet.    | 1. Possible host system failure.<br>2. Check interface logic with Service Aid 21.<br>3. Check EOT BOT circuit using Service Aid 32.<br>4. Ensure that EOT marker on tape is properly placed.                                |
| 15                | 1 1 1 1 0      | Data block exceeded maximum block size allowed (32KB). | 1. Possible host system failure (write operation).<br>2. Check ILWD interface input logic for a floating condition.                                                                                                         |
| 19                | 1 1 0 0 1      | Vertical parity error on retries.                      | 1. Check write and read circuits using Service Aid 23 (tape loaded).                                                                                                                                                        |
| 21                | 1 0 1 0 1      | Excessive retries on write filemarks.                  | 1. Re-adjust read threshold using Service Aid 21 (tape loaded).<br>2. Check write formatter circuits with Service Aid 13 tape unloaded, not file protected and writing 40-character blocks (press UNLOAD after test entry). |
| 22                | 0 1 1 0 1      | Early EOT marker encountered (switch U3T-1 option).    | 1. EOT marker located greater than 25 feet prior to actual EOT.<br>2. Relocate EOT marker.                                                                                                                                  |

## Method for medium 2 Error Recovery/Action

| INTERFACE                                       | RESULT WHEN UNIT IS OFF-LINE                                     | RESULT WHEN UNIT IS ON-LINE                                                                                                                             | OPERATOR ACTION                      |
|-------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| IHER is latched and the tape remains tensioned. | Front panel LED's are flashing and all switches are inoperative. | The flashing front panel LED's allows:<br>rewind from host,<br>rewind/unload from host, read data recovery from cache prior to rewind, extended status. | Cycle the power, rewind or unload. . |

| ERROR CODE NUMBER | BINARY DISPLAY | CONDITIONS                                                                                    | ACTION                                                                                                                                                                                                |
|-------------------|----------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6                 | 0 1 1 0 0      | The CTU received a write or erase command for a file-protected tape.                          | 1. Possible host system failure.<br>2. Check that write-enable ring is removed from tape reel.<br>3. Check file-protect circuit with Service Aid 31.<br>4. Check interface logic with Service Aid 21. |
| 7                 | 1 1 1 0 0      | An illegal or undefined command was received by the CTU.                                      | 1. Possible host system failure.<br>2. Check interface logic for floating or grounded inputs.                                                                                                         |
| 23                | 1 1 1 0 1      | No tape or hub seat failure during autoloading.                                               | 1. Insert a tape reel into the transport.<br>2. Make sure tape is properly seated.                                                                                                                    |
| 23                | 1 1 1 0 0      | Hub not locked, too much slack during autoloading.                                            | 1. Insert a tape reel into the transport.<br>2. Make sure tape is properly seated.                                                                                                                    |
| 25                | 1 0 0 1 1      | Not enough tape on take-up reel for manual load.                                              | 1. A minimum of five wraps is required.                                                                                                                                                               |
| 26                | 0 1 0 1 1      | Tape stuck on the supply during autoloading.                                                  | 1. Tape end did not peel off of reel. Remove antistatic tape-foam block if used.<br>2. If caused by static charge build-up, refer to MANUAL load instructions.                                        |
| 27                | 1 1 0 1 1      | Door interlock check.                                                                         | 1. Close front panel door or top cover.                                                                                                                                                               |
| 28                | 0 0 1 1 1      | Servo failure or hub is jammed during manual load.                                            | 1. Remove and re-insert tape reel to clear.<br>2. Possible belt crank failure.                                                                                                                        |
| 29                | 1 0 1 1 1      | Tape reel was inserted upside down or failure to get tape into tape path during autoloading.  | 1. The bottom of the tape reel is identified by the write-enable ring groove or the write-enable ring (when installed) near the inside mounting circumference.                                        |
| 31                | 1 1 1 1 1      | After four attempts, the CTU did not successfully complete the load sequence. Check tape end. | 1. The tape leader should be checked for excessive damage or static charge build-up.<br>2. If a second attempt at autoloading fails, refer to Manual load instructions.                               |

## Soft Error Definitions

| INTERFACE                 | RESULT WHEN UNIT IS OFF-LINE                                                     | RESULT WHEN UNIT IS ON-LINE                                                                     | OPERATOR ACTION     |
|---------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------|
| The CTU will go off-line. | Any front panel action-LOAD, UNLOAD, ON-LINE or power-off is allowed by the CTU. | The CTU goes off-line; the interface is inactive. Any front panel action is allowed by the CTU. | Allowed to go line. |

## Preventive Maintenance

Preventive maintenance (can be performed by the operator):

The tape-path (head, tape guides, take-up hub) must be cleaned with head cleaner (use FREON-TF) once a week in case of normal use. The drive must be placed in the maintenance position (cover opened), be sure that cover is locked.

## Adjustments

The adjustments are only necessary after a repairment or replacement.

For the adjustments see the CIPHER Service Manual Volume 1 OPERATION AND MAINTENANCE.

The adjustments are:

- Voltage Regulator adjustment, see Volume 1, section 4.16
- Read Threshold adjustment section 4.17
- Supply Hub assembly section 4.23
- Head assembly section 4.24
- Take-Up Hub assembly section 4.29
- Compliance arm section 4.31
- Take-Up Motor assembly section 4.40
- Tape Head Azimuth adjustment section 4.51





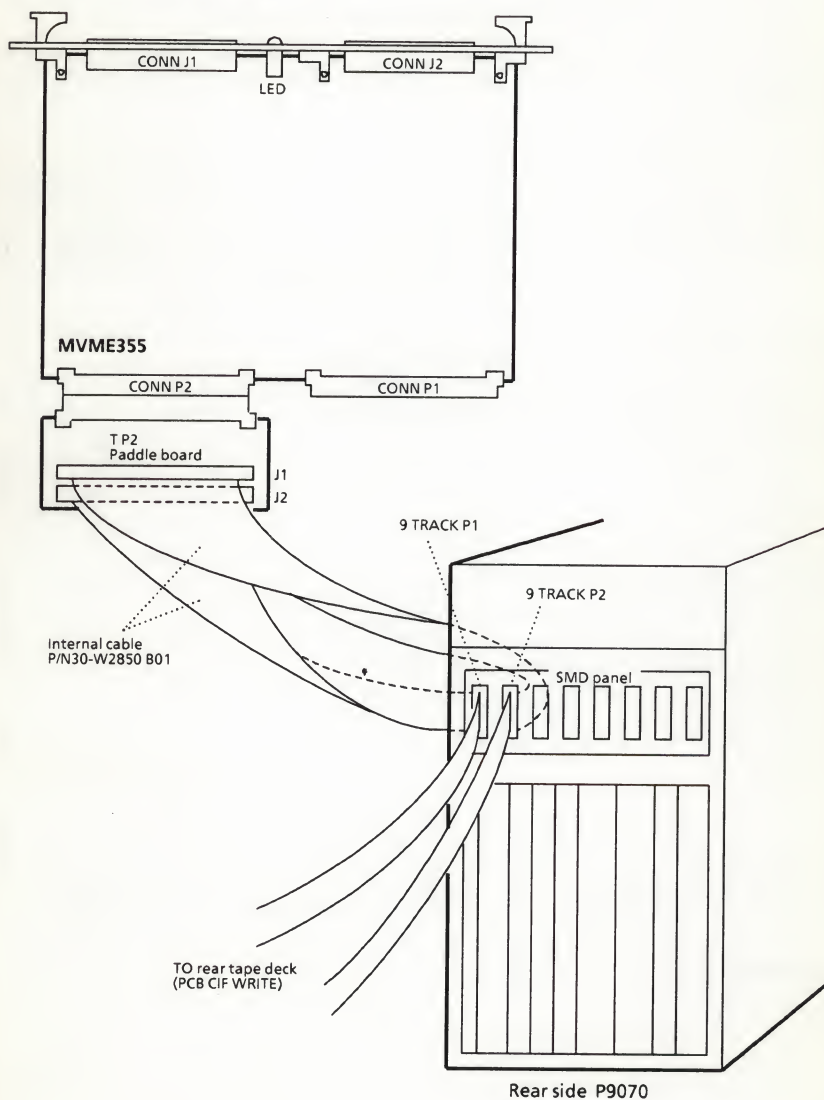


## 19.9 P3549-001 CIPHER M990

### 19.9.1

For the characteristics, see section 19.1.

### 19.9.2 Connections



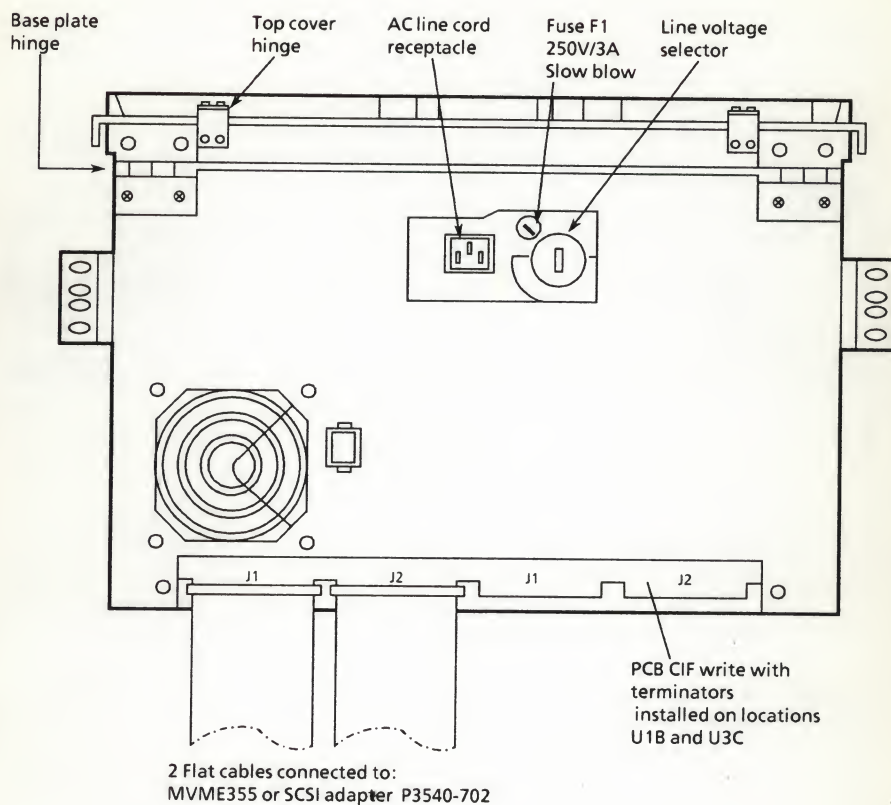
### 19.9.3 Strap Settings

The strap setting of the configuration parameters is done via the diagnostic test program 142 (see also 19.9.5). The setting should be done according to the table below.

| PARAMETER OPTIONS                    | OPTIONS                                                             | SETTING  |
|--------------------------------------|---------------------------------------------------------------------|----------|
| 1. Not Used                          | N/A                                                                 | N/A      |
| 2. Host Supplied Parity              | No, Yes                                                             | No       |
| 3. Echo Read Strokes on Write        | No, Yes                                                             | Yes      |
| 4. EOT Mode                          | Normal, T1                                                          | Normal   |
| 5. FWD Hitch Enabled                 | No, Yes                                                             | No       |
| 6. Echo 3200 BPI ID Burst            | No, Yes                                                             | Yes      |
| 7. Option Deleted                    | ----                                                                | ----     |
| 8. Abort Active Writes on Overwrites | No, Yes                                                             | No       |
| 9. Interface Transfer Rate           | 70.3, 79.1,<br>90.4, 105.5, 126.6, 158.2,<br>211.0, 316.5, 632.8KBS | 632.8KBS |
| 10. Default Density at Power Up      | 1600, 3200,<br>6250 BPI                                             | 6250 BPI |
| 11. Maximum Block Size               | 9K, 16K, 24K, 32K, 64K                                              | 32K      |
| 12. Interface Ramp Delay             | 0-15 milliseconds                                                   | 3MS      |
| 13. Filemark Write Sync              | No, Yes                                                             | Yes      |
| 14. Read Error Retry                 | 0, 3, 7, 11, 15                                                     | 15       |
| 15. Write error Retry                | 0, 3, 7, 11, 15                                                     | 15       |
| 16. Error Correction ON              | No, Yes                                                             | Yes      |
| 17. Unit 0-7                         | 0                                                                   | 0        |
| 18. Lock Out 3200 BPI Writes         | No, Yes                                                             | No       |
| 19. Remote Density Select Enabled    | No, Yes                                                             | Yes      |
| 20. Report Corrected Errors          | No, Yes                                                             | Yes      |
| 21. Allow Single Write Errors (GCR)  | No, Yes                                                             | No       |
| 22. Nonalterable Values              | N/A                                                                 | N/A      |
| 23. " "                              | " "                                                                 | " "      |
| 24. " "                              | " "                                                                 | " "      |
| 25. " "                              | " "                                                                 | " "      |
| 26. " "                              | " "                                                                 | " "      |
| 27. " "                              | " "                                                                 | " "      |
| 28. 3200/6250 BPI                    | Yes/No                                                              | No       |
| 29. Display Ft From EOT              | Yes/No                                                              | No       |

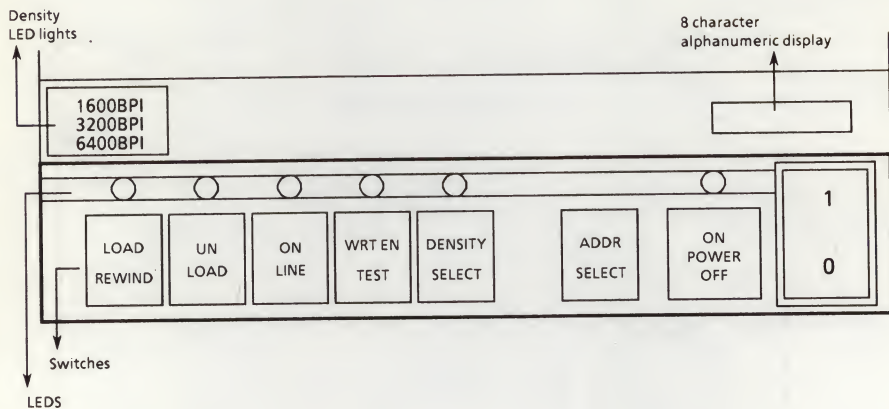
Software strapping see chapter 19.8.3

## Fuse and Terminators



## 19.9.4 Installation

Refer to M990 Installation Manual, Function of the Control Panel:



| FUNCTION          | SWITCHES                                                                                                                                                                                                                                                            | LED/DISPLAY                                                                                                                                                                                                       |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power On/Off      | Double-pole AC-switch.<br>In "On" position AC power is enabled to the drive's power supply.<br>In "Off" position no power to drive's supply.                                                                                                                        | LED is "On"<br><br>LED is "Off"                                                                                                                                                                                   |
| Load/Rewind       | Causes tape to be auto-loaded and positioned at the BOT marker. Only active when drive is OFF Line.<br>If load is pressed while depressing the Density switch auto-load's can be used.                                                                              | Led flashes as the tape loads and remains lit when loading is complete.<br>During auto-load process the alphanumeric display exhibits the word LOADING.<br>The tape density is displayed on the density LED bars. |
| Unload            | If the drive is off line this switch causes the tape to unload from any point, the reel to unlock, and the door latch to open.                                                                                                                                      | LED flashes as the tape rewinds and remains lit when tape path is clear.<br>At completion of the unload the alphanumeric display, displays the word: UNLOADED                                                     |
| On-Line           | When pressed the tape is placed under control of the host system.<br>A second actuation causes the drive to go off line.                                                                                                                                            | LEDs is lit when On-line switch is pressed.<br>LED is shut off when on0line switch is pressed a second time.                                                                                                      |
| Test/Write Enable | If the unit is in off-line mode this switch is used to start up a diagnostic sequence under control of a customer engineer.<br>As indicator it indicates that a write enable ring is installed on the tape reel and info can be written to or erased from the tape. | LED flashes and alphanumeric display displays the number "4" indicating the drive is in test mode.                                                                                                                |
| Density Select    | Pressing this switch you can check the operating density (1600, 3200, 6400 bpi).<br>The select density is indicated by the density LEDs.<br>The switch can only be used when the tape is at load point.                                                             |                                                                                                                                                                                                                   |
| Address Select    | Press the Address select switch to determine the tape drive address for each M990 when more than one is connected to the same system.<br>The address selected is displayed on the alphanumeric display as: UNITX                                                    |                                                                                                                                                                                                                   |



## 19.9.5 Maintenance

### Diagnostic

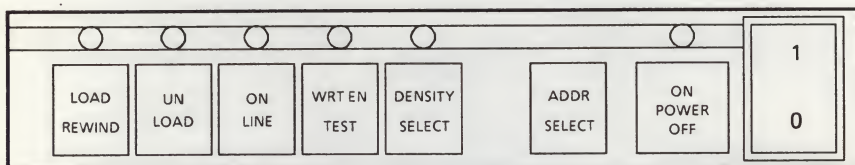
The M990 tape unit has three separate types of built-in diagnostic tests.

1. Power-On Confidence Tests - Automatic power-on self diagnostic tests.
2. Series 100 Tests - Diagnostic test **WITHOUT** a tape loaded.
3. Series 200 Tests - Diagnostic tests **WITH** a tape loaded.

The alphanumeric messages displayed during the diagnostic tests are shown below along with a brief description of each test.

### Starting the Diagnostic Test

Check to see that the On-Line indicator is off. If the indicator is on, press the On-Line switch to switch the unit to an off-line mode.



**NOTE:** Steps 2 through 5 must be accomplished within 3 seconds between keystrokes. If too much time is used, the GCR will automatically return to the normal operating mode.

1. Press with Wrt En/Test switch number 4.
2. Press the DENSITY SELECT switch number 5.
3. Press the switch numbers that represent the test to be run.
4. Press the DENSITY SELECT switch number 5 to **START** the diagnostic test.
5. Press the Wrt En/Test switch number 4 to **STOP** or cancel the diagnostic test.

**NOTE:** Some diagnostic tests require you to stop the test from running before you cancel the diagnostic.

When a diagnostic test is first entered, specific front panel indicators are lit to indicate the options available at this point.

The diagnostic tests can operate in either the text execution mode or the parameter selection mode. The parameter selection mode allows you to select the operational parameters that are used when the test is run in the execution mode.

During the test, the alphanumeric display will display information about the drive's status.

## Diagnostic Tests WITHOUT Tape Loaded (Series 100)

**CAUTION:** Remove tape prior to running series 100 tests, failure to do so could cause damage to tape.

### Available Tests:

- TEST 111 (Oscillate Servos)  
This test checks both the supply and take-up motors and their related servo circuits.
- TEST 124 (Voltage Test)  
This test displays the analog voltage ( $\pm 20\%$ ) of a certain signal.
- TEST 125 (PROM Division)  
This test displays the part number of the PROM's installed in the UNIT.
- TEST 131 (File Protect/Reel Seat, BOT, EOT, and Tape-In-Path)  
This test checks the status and operation of the above descript items.
- TEST 132 (Door and Hub lock)  
This test, when entered cycles both door lock and hub lock soleniods.
- TEST 133 (Door Open)
- TEST 134 (Blower Motor)
- TEST 142 (Edit NOVRAM)  
Software Strapping of drive parameters (see strapsetting of this chapter).

## Diagnostic Tests WITH Tape Loaded (Series 200)

When entered, the diagnostic tests that move tape will default to the density/speed combinations shown below if the tape is write enabled. If the tape is write protected, the test will determine the density/speed combination that is compatible with the data written on the tape. The density is displayed on the front panel LED's.

Model M990:     1600bpi/100ips  
                   3200bpi/50ips  
                   6250bpi/70ips

### Available Tests:

- TEST 212 (Read/Write Data)
- TEST 222 (Tape Shuttle)  
(forward and revers movement)
- TEST 223 (Read/Write Check)
- TEST 224 (Voltage Display)
- TEST 233 (Door Open)
- TEST 242 (Edit NOVRAM)
- TEST 243 (No Write Retries)
- TEST 244 (Infinite Read/Write Retries)
- TEST 255 (Display Status)

**NOTE:** *For Error Results  
For Trouble Shooting  
For Preventive Maintenance*

*See chapter 4 and 5 of the M990 GCR  
Cache Tape Unit Technical Manual*

## **Preventive Maintenance**

For proper operation of the tape unit it is necessary that the operator, the user, does some preventive maintenance, see therefore the CIPHER Service Manual, volume 1 Operation and Maintenance section 4.2.

The Preventive Maintenance for the engineer consists of:

- Semi-annually, vacuum clean the whole tape deck
- After 5000 hours replace reel motors. See the CIPHER Manual volume 1, Operation Maintenance, section 4.40 and 4.44.

## 19.10 P3540-702 SCSI Adapter

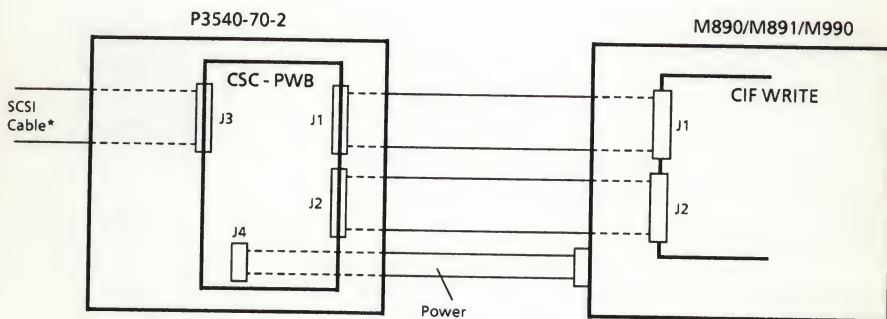
### 19.10.1 Characteristics

The P3540-702 SCSI adapter is used to adapt the CIPHER M890/M891 and the M990 tape drives to the SCSI bus.

#### Technical data:

|               |                                      |
|---------------|--------------------------------------|
| Model No      | CSC 100                              |
| Dimensions,   |                                      |
| Height        | 6.8"                                 |
| Width         | 16.5"                                |
| Depth         | 3.0"                                 |
| Power         | Power supplied by the tape drive     |
|               | 30Vdc 0.6A                           |
| Transfer rate | 1.5Mbytes/sec maximum (asynchronous) |

### 19.10.2 Connections

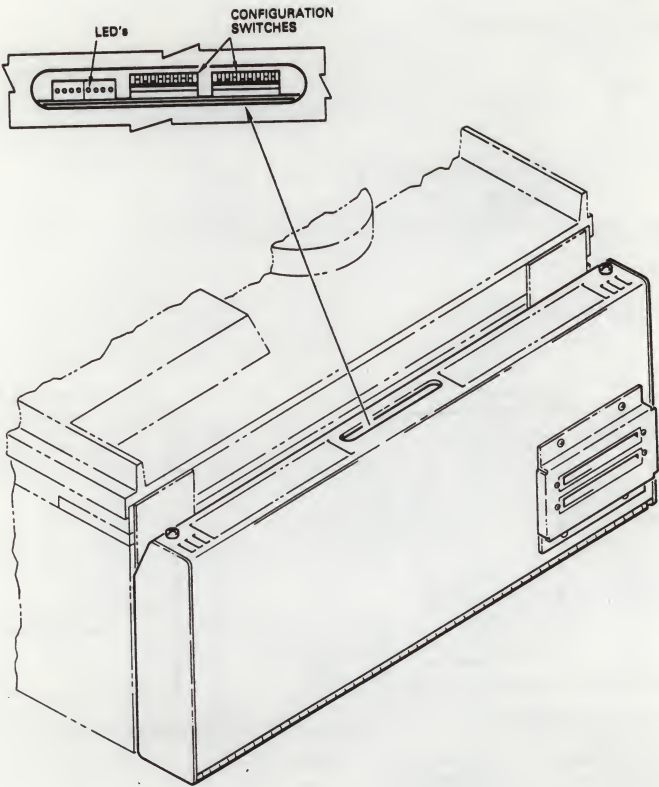


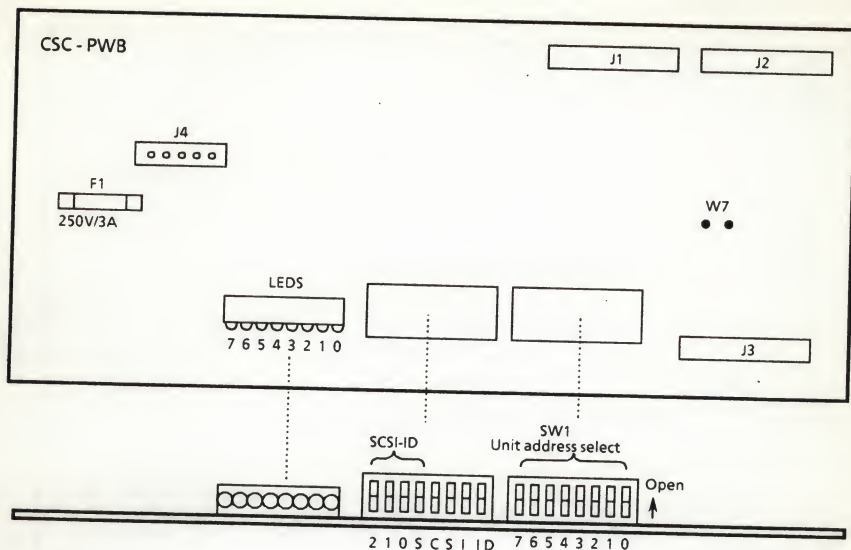
**NOTE:** Assy P3540-702 is mounted directly onto assy M890/M891 or M990

- \* For connection to an MVME327A See: 12.5.2
- For connection to an MVME328-1/2 See: 9.8.2
- For connection to an MVME147/147S See: 9.6.2
- 9.7.2



19.10.3 Strap Settings





## Configuration Switches

**WARNING:** The numbering is according to the silk screen on the board.

### SCSI-ID

| 2          | 1         | 0          | SCSI-ID  |
|------------|-----------|------------|----------|
| On         | On        | On         | 0        |
| On         | On        | Off        | 1        |
| On         | Off       | On         | 2        |
| On         | Off       | Off        | 3        |
| Off        | On        | On         | 4        |
| <b>Off</b> | <b>On</b> | <b>Off</b> | <b>5</b> |
| Off        | Off       | On         | 6        |
| Off        | Off       | Off        | 7        |

Adapter is standard strapped to SCSI-ID 5

Switch S (between **0** and **C**) is the hardware reset switch, its normal position is **Open**. Toggle it to reset the SCSI adapter.

The rest of the switches of this group is set to the position "Open" but is not used.

## Unit Address Select

| SWITCH | POSITION |        | FUNCTION                                                                   |
|--------|----------|--------|----------------------------------------------------------------------------|
| SW1    | 0        | 1      |                                                                            |
|        | Closed * | Closed | 1 Unit available on controller                                             |
|        | Open     | Closed | 2 Units available on controller                                            |
|        | Closed   | Open   | 3 Units available on controller                                            |
|        | Open     | Open   | 4 Units available on controller                                            |
|        | 2        | 3      |                                                                            |
|        | Closed*  | Closed | Normal                                                                     |
|        | Open     | Closed | Loop on power-up routines                                                  |
|        | Closed   | Open   | Loop on RAM data dump                                                      |
|        | Open     | Open   | Allow execution after power-up failure                                     |
|        | 4        | 5      |                                                                            |
|        | Closed** | Closed | M880                                                                       |
|        | Open     | Closed | M890/891                                                                   |
|        | Closed   | Open   | M990 (up to 32K data blocks; data recoverable after fatal drive error)     |
|        | Open     | Open   | M990 (up to 64K data blocks; data not recoverable after fatal drive error) |
|        | 6        |        |                                                                            |
|        | Closed*  |        | Parity checked                                                             |
|        | Open     |        | Non-parity checked                                                         |
|        | 7        |        |                                                                            |
|        | Closed*  |        | Arbitrating Model                                                          |
|        | Open     |        | Non-arbitrating Model                                                      |

\* Preferred Strapsetting

\*\* Switches 4 and 5 are depending on the type of tape that is connected.

**CAUTION:** Strap W7 must be open.

W7: If not open, by every power-on from the Tape Unit or Toggle Switch 5 from the configuration switches, the SCSI bus will be reset resulting in a system-hang. The rest of the straps on the CSC PWB are factory setted.

# LEDs

| Error Code No. | Functional Errors/Failures                   |
|----------------|----------------------------------------------|
| (Hexadecimal)  |                                              |
| 91             | PROM #1 check sum                            |
| 92             | PROM #2 check sum                            |
| 93             | PROM #3 check sum                            |
| 94             | 8085 MPU test - Register and Memory commands |
| 95             | Controller RAM test                          |
| 97             | Timer test                                   |
| 98             | SCSI Protocol - Controller test              |
| 99             | 8085 MPU test - Jump and initial command     |
| 9B             | DMA Register test                            |
| 9D             | DMA Data Paths test                          |
| 9F             | Data Buffer test                             |



## 19.10.4 Installation

**NOTE:** Refer to the M890/M891 or M990 Installation Manual.

1. Open the top cover of the tape drive.
2. Open the top plate by lifting the sides directly behind the front panel. Place the safety pin in the hole provided in the top plate support arm.
3. Disconnect the main harness from the PWB.
4. Locate the small male connector tie-wrapped to the main harness; this is the SCSI power and ground harness. Cut and remove the three tie wraps that secure it to the main harness.
5. Route the SCSI harness to the back of the tape drive. Loosely attach an adhesive backed tie wrap anchor to the SCSI harness. Attach the anchor to the back wall of the chassis.
6. Route the male end of the SCSI harness through the large opening in the back of the chassis. Connect the male connector to the female connector of the SCSI power cable.
7. Reconnect the main harness assembly to the PWB.
8. Assemble the mounting screw, bracket, and well nut to the CSC chassis. Slide the bracket into the slot on the front side of the CSC, with lip down, facing away from CSC. Insert the screw through the bracket, into the hole in the CSC chassis slot, and secure with the well nut. (Bracket is used only with Microstreamer and Cache Tape units).
9. Route the power cable through the chassis slot (bottom) of the CSC housing.
10. Hook the CSC assembly onto the back of the tape drive housing and tighten the well nut, while applying upward pressure on the bracket. The bracket should securely hold the CSC against the tape drive chassis.
11. Plug the power cable into J4 on the CSC board. Secure it to the CSC housing with the provided tie wrap anchor.
12. Plug the interface cables to the PWB assembly and to the CSC assembly board. J1 and J2 plug into P1 and P2, respectively. Loop the cable.
13. Close the CSC enclosure. Fasten one end of each ground strap to each screw on top of the CSC housing. Tighten the screws.
14. Fasten the other end of each ground strap onto the back of the top plate using one hinge screw on each end of the top plate.
15. Check that the drive passes the power-up tests.
16. Install the drive in rack or enclosure. Remove the window on an enclosure - for I/O cable access - before reinstalling the tape drive unit.

## 19.10.5 Maintenance

The SCSI adapter does have power-on diagnostics, see also the table with the Functional errors/failures.

The SCSI adapter must be tested as an integral part of the tape drive. The tape drive can be tested via the processor debugger and diagnostics, also the SSID tests can be used.

Section:

Page:

|                   |        |
|-------------------|--------|
| 1: Technical Data | 20.1-1 |
|-------------------|--------|

|                                      |         |         |         |          |          |
|--------------------------------------|---------|---------|---------|----------|----------|
| 2: NMS1480/NMS1481                   | n.a.    | 20.2-1  | 20.2-4  | 20.2-6   | 20.2-13  |
| 3: P2908/P2909<br>Epson FX800/FX1000 | n.a.    | 20.3-1  | 20.3-2  | 20.3-6   | 20.3-7   |
| 4: P2934 GP300                       | n.a.    | n.a.    | 20.4-1  | 20.4-11  | 20.4-12  |
| 5: P2936 GP310                       | n.a.    | 20.5-1  | 20.5-2  | 20.5-12  | 20.5-18  |
| 6: P2942 PP402                       | n.a.    | 20.6-2  | 20.6-3  | 20.6-8   | 20.6-14  |
| 7: P2945 PP405                       | 20.7-1  | 20.10-2 | 20.7-2  | 20.7-2   | 20.7-8   |
| 8: P2950/P2951<br>Qume S11 +         | n.a.    | 20.8-1  | 20.8-5  | 20.8-8   | 20.8-10  |
| 9: P2963/66-101<br>P6240/P6280       | n.a.    | 20.9-1  | 20.9-2  | 20.9-3   | 20.9-5   |
| 10: P2973<br>Qume Laser Ten +        | n.a.    | 20.10-1 | 20.10.7 | 20.10-10 | 20.10-18 |
| 11: P2975<br>Fujitsu RX7200          | 20.11-1 | 20.11-2 | 20.11-5 | 20.11-7  | 20.11-8  |
| 12: P2982-017<br>Fujitsu RX7300      | 20.12-1 | 20.12-3 | 20.12-4 | 20.12-8  | 20.12-8  |

Subsection:

1 Characteristics

2 Connections

3 Strap Settings

4 Installation

5 Maintenance

**NOTE:** n.a. means that this section is not available for this unit.



## 20.1 TECHNICAL DATA

| SPECIFICATION PRINTER               |                      | NMS 1480/NMS1481                                                                                           |
|-------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------|
| Type                                |                      | Laser printer                                                                                              |
| Memory                              | standard<br>optional | 512 Kb<br>1Mb, 2Mb, 4Mb                                                                                    |
| Interface                           |                      | RS-232C<br>RS-422<br>Centronics                                                                            |
| Emulation module (NMS1480)          | standard<br>optional | HP Laser jet series II<br>Diablo 630, Epson FX80+, IBM proprinter XL, PDL postscript                       |
| Emulation module (NMS1481)          | standard<br>optional | HP Laser jet series II, Epson FX80+, IBM proprinter XL<br>Diablo 630, PDL postscript                       |
| Fonts                               | standard<br>optional | 6 (3 portrait, 3 landscape)<br>all kind of different font cartridges such as HP-A, B, C, D                 |
| Print resolution                    |                      | 300 × 300 dots per inch                                                                                    |
| Duty factor                         |                      | 3000 pages per month                                                                                       |
| Printspeed                          |                      | 6 pages per minute                                                                                         |
| Media handling                      |                      | A4, B5, Letter, Legal paper sizes<br>single tray 150 sheets                                                |
| Nr. of copies                       |                      | 1 original                                                                                                 |
| Optical system<br>laser diode:      |                      | semiconductor<br>5mWatt laser power, 780 nm                                                                |
| OPC drum:                           |                      | organic plastic coating                                                                                    |
| Power requirements and<br>frequency |                      | 90-132V 50/60 hz<br>198-264V 50hz<br>Selectable from 2 types                                               |
| Consumption                         |                      | 600 Watt operating<br>60-450 Watt stand by                                                                 |
| Warm up time                        |                      | max. 60 seconds                                                                                            |
| Temperature                         |                      | Operating: + 10 °C to + 35 °C<br>Storage (6 months): 0 °C to + 35 °C                                       |
| Humidity                            |                      | Operating: 20% to 80% rel.<br>Storage (6 months): 20% to 85% rel.                                          |
| Dimensions                          |                      | length without face up tray: 622 mm<br>length with face up tray: 902 mm<br>height: 210 mm<br>depth: 390 mm |
| Weight                              |                      | 16 kg                                                                                                      |
| Noise                               |                      | < 52 dB(A) operating<br>< 45 dB(A) stand by                                                                |



| SPECIFICATION<br>PRINTER                                              | P2908<br>(EPSON FX800)                                                                                 | P2909<br>(EPSON FX1000)                                                                      | P2934<br>(GP300)                                                                 | P2936<br>(GP310)                                                                                                       |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Type                                                                  | Impact dot matrix                                                                                      | Impact dot matrix                                                                            | Impact dot matrix                                                                | Impact dot matrix                                                                                                      |
| Interface                                                             | RS-232C                                                                                                | RS-232C                                                                                      | RS-232C                                                                          | RS-232                                                                                                                 |
| Print Speed (max.)                                                    | 160 cps                                                                                                | 160 cps                                                                                      | 300 cps                                                                          | 310 cps                                                                                                                |
| Power Requirements:<br>Voltage (VAC)                                  | 220/240/110<br>(not selectable)                                                                        | 220/240/110<br>(not selectable)                                                              | 100-127/200-240                                                                  | 100-127/200-240                                                                                                        |
| Consumption (VA)<br>Frequency (Hz)                                    | 49.5 - 60.5                                                                                            | 49.5 - 60.5                                                                                  | 50 - 60                                                                          | 85(typ)/135(max)<br>50 - 60                                                                                            |
| Dimensions:<br>Width (mm)                                             | 420                                                                                                    | 594                                                                                          | 636                                                                              | 600                                                                                                                    |
| Height (mm)                                                           | 100                                                                                                    | 106                                                                                          | 198                                                                              | 165                                                                                                                    |
| Depth (mm)                                                            | 347                                                                                                    | 354                                                                                          | 518                                                                              | 427                                                                                                                    |
| Weight (kg)                                                           | 7.5                                                                                                    | 10.4                                                                                         | 20.4                                                                             | 16                                                                                                                     |
| Media Specifications:<br>Paper Requirements                           |                                                                                                        |                                                                                              |                                                                                  |                                                                                                                        |
| Paper Height (inch)                                                   | 9.5-10 (pinfeed)<br>7.25 - 8.5<br>(friction feed)                                                      | 4.16 (pinfeed)<br>7.25 - 14.4<br>(friction feed)                                             | 4/4.17/6/8<br>8.5/11/12                                                          | 4/4.17/6/8<br>4/7/8.5/12/14                                                                                            |
| Paper Width (mm)                                                      |                                                                                                        |                                                                                              | 400                                                                              | 380                                                                                                                    |
| Nr. of Copies (max.)                                                  | 2                                                                                                      | 2                                                                                            | { dependent<br>on type<br>of paper<br>transport                                  | { dependent<br>on type<br>of paper<br>transport                                                                        |
| Weight (g/m <sup>2</sup> )                                            | { total max.<br>thickness<br>0.3 mm                                                                    | { total max.<br>thickness<br>0.3 mm                                                          | {                                                                                | {                                                                                                                      |
| Copy (g/m <sup>2</sup> )                                              | {                                                                                                      | {                                                                                            | {                                                                                | {                                                                                                                      |
| Carbon (g/m <sup>2</sup> )                                            | {                                                                                                      | {                                                                                            | {                                                                                | {                                                                                                                      |
| Paper Transport<br>Standard<br>Optional                               | Friction feed and<br>pinfeed<br>Tractorfeed ASSF                                                       | Friction feed and<br>pinfeed<br>Tractorfeed ASSF                                             | Platenfeed and<br>frontfeed<br>Tractorfeed,<br>automatic single<br>sheet handler | Platenfeed<br>Frontfeed<br>Tractorfeed +,<br>automatic single<br>sheet handler                                         |
| 12-NC Numbers<br>Technical 12-NC<br>Service 12-NC<br>Commercial 12-NC | 5112 291 46424<br><br>8700 029 08015<br>(220V)<br>8700 029 08025<br>(240V)<br>8700 029 08035<br>(110V) | 4112 291 46423<br><br>8700 029 09015<br>(220V)<br>8700 029 09025<br>(240V)<br>8700 029 09035 | <br><br>8707 155 32003<br>(TTY; BMR)<br>8707 151 32003<br>(LWSI)                 | 8707 220 00003 =<br>(small panel)<br>8707 220 00004 =<br>(full panel)<br>8707 220 901202 =<br>(pers. module<br>P9000m) |
| Options                                                               |                                                                                                        |                                                                                              |                                                                                  | Font module 32k<br>Ram.                                                                                                |
| Remarks                                                               | End Commercial<br>Delivery                                                                             | End Commercial<br>Delivery                                                                   | End Commercial<br>Delivery                                                       | End Commercial<br>Delivery                                                                                             |

| SPECIFICATION PRINTER | P2942 (PP402)                                                    |
|-----------------------|------------------------------------------------------------------|
| Type                  | Impact dot matrix                                                |
| Buffer size           | 5Kb, optional 64Kb                                               |
| Interface             | Parallel      Centronics<br>Serial        RS-232C, V24/V28       |
| Graphics              | 360 x 360 dpi                                                    |
| Number of fonts       | 9                                                                |
| Print speed           | 230/280 cps for draft quality<br>80/95 cps for letter quality    |
| No. of Copies         | Original + 3 copies for non carbon,<br>40 g/m <sup>2</sup> paper |
| Power Requirements    | 120 VAC for USA/Canada<br>220/240 VAC for Europe                 |
| Consumption           | 50 W operating<br>16 W standby                                   |
| Temperature           | +5°C to +35°C operating                                          |
| Humidity              | Operating: 20% to 80% rel.<br>Storage: 20% to 90% rel.           |
| Dimensions            | Length: 585 mm<br>Height: 350 mm<br>Depth: 128 mm                |
| Weight                | 11 kg                                                            |
| Noise                 | < 55 dB(A)                                                       |
| Paper transport       | Tractor feed<br>Cut sheet feeder<br>Automatic sheet feeder       |
| Emulation             | Epson LQ-1050 (A-mode)<br>IBM proprinter XL24 (I-mode)           |

| SPECIFICATION PRINTER | P2945 (PP405)                                                                                    |
|-----------------------|--------------------------------------------------------------------------------------------------|
| Type                  | Needle printer                                                                                   |
| Buffer size           | 16Kb, optional 64Kb                                                                              |
| Interface             | Parallel Centronics<br>Serial RS-232C, V24/V28                                                   |
| Printhead             | 24 needles (0.25mm)                                                                              |
| Emulations            | Philips GP310/490<br>IBM 4207 Proprinter II                                                      |
| Type styles           | Data, Letter-gothic, Letter-gothic-Italic-2, Courier Micro, Orator                               |
| Print speed           | 600cps for draft quality<br>165 cps for letter quality                                           |
| Number of copies      | Original plus 5 copies (max thickness of form set 0.5mm)                                         |
| Power requirements    | 100 - 120Vac 50-60Hz<br>200 - 240Vac 50-60Hz                                                     |
| Power consumption     | 160VA operating<br>40VA standby                                                                  |
| Env. temperature      | Operating +10 to +35 degrees C<br>Storage -40 to +70 degrees C                                   |
| Humidity              | Operating 20% to 80% (30% to 70% with ASF)<br>Storage 5% to 85%                                  |
| Dimensions            | Width 635mm<br>Depth 415mm<br>Height 273mm without stacker<br>400mm with all three ASF cassettes |
| Weight                | 23kg                                                                                             |
| Noise                 | Less than 50dB(A)                                                                                |
| Paper handling        | Manual insertion<br>Tractor feed<br>Automatic insertion                                          |

| SPECIFICATION PRINTER                          | P2950<br>(Qume S11 + 55)                                        | P2951<br>(Qume S11 + /Wide track)                       |
|------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------|
| Type                                           | Daisywheel printer                                              | Daisywheel printer                                      |
| Interface                                      | RS-232C                                                         | RS-232C                                                 |
| Print Speed                                    | 55 c/s max.                                                     | 50 c/s max.                                             |
| Print Direction                                | Bidirectional<br>Unidirectional                                 | Bidirectional<br>Unidirectional                         |
| Printwheel                                     | 96 characters                                                   | 130 characters                                          |
| Characters per Line                            | 132 at 10 c/i<br>158 at 12 c/i<br>198 at 15 c/i                 |                                                         |
| Media Handling<br>Nr. of Copies                | Friction feed (15" max.)<br>Tractor feed<br>1 + 5 (max. 0.025") | Friction feed (22" max.)<br>Tractor feed                |
| Power Requirements<br>Frequency<br>Consumption | 90 ÷ 132 VAC<br>180 ÷ 264 VAC<br>49 ÷ 63 Hz<br>150 Watt         | 90 ÷ 132 VAC<br>180 ÷ 264 VAC<br>49 ÷ 63 Hz<br>150 Watt |
| Temperature                                    | Operating: +10°C to +40°C<br>Storage: -40°C to +60°C            | Operating: +10°C to +40°C<br>Storage: -40°C to +60°C    |
| Humidity                                       | Operating: 10% to 90% rel.<br>Storage: 10% to 95% rel.          | Operating: 10% to 90% rel.<br>Storage: 10% to 95% rel.  |
| Dimensions                                     | Length: 610 mm<br>Height: 178 mm<br>Depth: 450 mm               | Length: 814 mm<br>Height: 178 mm<br>Depth: 450 mm       |
| Weight                                         | 16.8 kg                                                         | 20.5 kg                                                 |
| Noise                                          | < 63 dB(A)                                                      | < 60 dB(A)                                              |
| Remarks                                        | End Commercial Delivery                                         | End Commercial Delivery                                 |



| SPECIFICATION PRINTER                                         | P2973<br>(Qume Laser Ten +)                                                                   |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Type                                                          | Laser printer                                                                                 |
| Memory                                                        | 512 Kb                                                                                        |
| Interface                                                     | RS-232C<br>Centronics<br>Three in one emulation module<br>HP Laser yet                        |
| Print Resolution                                              | 300 x 300 dots per inch                                                                       |
| Number of Resident Fonts                                      | 3 (courier = standard)<br>Optional 3 digifont cartridges (max. 5 fonts per cartridge).        |
| Duty Factor                                                   | 5000 PPM                                                                                      |
| Printspeed                                                    | 10 pages per minute                                                                           |
| Media Handling                                                | A4 LS LG paper sizes<br>Single tray 250 sheets                                                |
| Nr. of Copies                                                 | 1 original                                                                                    |
| Optical System<br>Laser Diode:<br>Scanner Motor:<br>OPC Drum: | Semiconductor<br>5mWatt laser power, 780nm<br>7718 RPM $\pm 0.1\%$<br>Organic plastic coating |
| Power Requirements<br>Frequency<br>Consumption                | 110 $\div$ 220 VAC<br>49 $\div$ 63 Hz<br>700 Watt operating                                   |
| Warm-up Time                                                  | Max. 90 seconds                                                                               |
| Temperature                                                   | Operating: + 15°C to + 32°C<br>Storage: 5°C to + 40°C                                         |
| Humidity                                                      | Operating: 20% to 80% rel.<br>Storage: 20% to 85% rel.                                        |
| Dimensions                                                    | Length: 445 mm<br>Height: 386 mm<br>Depth: 516 mm                                             |
| Weight                                                        | 38 kg                                                                                         |
| Noise                                                         | < 50 dB(A)                                                                                    |
| Remarks                                                       | End Commercial Delivery                                                                       |

| SPECIFICATION PRINTER                                     |                      | P2975 (Fujitsu RX 7200)                                                                                                                                         |
|-----------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                                                      |                      | Laser printer                                                                                                                                                   |
| Memory                                                    | standard<br>optional | 640 Kbytes<br>1Mbytes, 2Mbytes                                                                                                                                  |
| Interface                                                 |                      | RS-232C<br>Centronics                                                                                                                                           |
| Emulation module                                          | standard             | HP Laser jet series II<br>Diablo 630, Epson FX85, IBM pro printer                                                                                               |
| Fonts<br>(Portrait and Landscape)                         | standard<br>optional | Courier 10cpi, Prestige Elite 12 cpi, Times Roman 10 point,<br>Line Printer 16,6 cpi<br>HP Fonts via max. 3 ic-cards                                            |
| Print resolution                                          |                      | 300 × 300 dots per inch                                                                                                                                         |
| Duty factor                                               |                      | 10.000 pages per month                                                                                                                                          |
| Printspeed                                                |                      | 10 to 13 pages per minute (continuous printing after first print)                                                                                               |
| Media handling<br>automatic feed<br>manual feed<br>output |                      | A4, B5, Letter, Legal paper sizes<br>A4, B5, Letter, Legal paper sizes<br>Postcard and or two paper trays, each 250 sheets<br>Face down stacker, 250 sheet cap. |
| Print Technology                                          |                      | Laser Beam, Laser Diode with Heat-roller Fiscing                                                                                                                |
| Power requirements                                        |                      | 115-120V 50 60 Hz<br>220-240V 50 60 Hz                                                                                                                          |
| Power consumption                                         |                      | 800 Watt operating (115 VAC)                                                                                                                                    |
| Warm-up time                                              |                      | 60 seconds                                                                                                                                                      |
| Temperature                                               |                      | Operating: 10 °C to +35 °C<br>Storage: 0 °C to +35 °C                                                                                                           |
| Humidity                                                  |                      | Operating: 20% to 80% rel.<br>Storage: 20% to 80% rel.                                                                                                          |
| Dimensions                                                |                      | Width : 430 mm<br>Depth : 580 mm<br>: 550 mm (excl. operator panel)<br>Height: 350mm                                                                            |
| Weight                                                    |                      | 35 kg (single cassette)                                                                                                                                         |
| Noise                                                     |                      | < 50 dB(A)                                                                                                                                                      |

| SPECIFICATION PRINTER |                      | P2982-017 (Fujitsu RX7300E)                                                                                                                        |                        |
|-----------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Type                  |                      | Laser printer                                                                                                                                      |                        |
| Memory                |                      | 2.5Mb (standard)                                                                                                                                   |                        |
| Interface             |                      | Parallel Centronics                                                                                                                                |                        |
| Emulation modules     |                      | HP Laser Jet plus, IBM Proprinter XL, Diablo 630API,Epson FX80, Qume S11, Fujitsu M304X                                                            |                        |
| Fonts                 | standard<br>optional | Courier 10, Prestige Elite 12, Line printer 16.66, Times Roman 8, Times Roman 10, Times Roman 12<br>Numerous fonts available via the option cards. |                        |
| Print resolution      |                      | 300 x 300 dots per inch                                                                                                                            |                        |
| Duty factor           |                      | 25.000 pages per month                                                                                                                             |                        |
| Print speed           |                      | 17 to 24 pages per minut                                                                                                                           |                        |
| Media handling        |                      |                                                                                                                                                    |                        |
| Cassette feed         | standard<br>optional | A4<br>B4, B5, Letter, Legal<br>Postcard size minimum                                                                                               |                        |
| Manual feed           |                      | Face-down stacker                                                                                                                                  |                        |
| Output                |                      | Face-down collection with job separation control<br>Alternate face-up stacker.<br>Both stackers capacity 250 sheets appr.                          |                        |
| Print technology      |                      | Laser beam, laser diode with heat roller fixing                                                                                                    |                        |
| Power requirements    |                      | Less than 1kVA                                                                                                                                     |                        |
| Power consupcion      |                      | 100 - 120V                                                                                                                                         | 50 60Hz                |
|                       |                      | 220 - 240V                                                                                                                                         | 50 60Hz                |
| Warm-up time          |                      | 110 seconds                                                                                                                                        |                        |
| Temperature           |                      | Operating                                                                                                                                          | + 10 to + 35 degrees C |
|                       |                      | Storage                                                                                                                                            | 0 to + 35 degrees C    |
| Humidity              |                      | Operating                                                                                                                                          | 20% to 80% rel.        |
|                       |                      | Storage                                                                                                                                            | 20% to 80% rel.        |
| Dimensions            |                      | Without paper cassette and paper tray<br>Width 580mm<br>Depth 510mm<br>Height 310mm                                                                |                        |
| Weight                |                      | 55kg                                                                                                                                               |                        |
| Noise                 |                      | Less than 52dB(A)                                                                                                                                  |                        |
| Remarks               |                      | End Commercial Delivery                                                                                                                            |                        |

| SPECIFICATION PRINTER | P2963/2966-101 Printronix (P6240/P6280)                                                                                                     |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Type                  | Line impact dot matrix                                                                                                                      |
| Interface             | Serial RS232C                                                                                                                               |
| Emulation modules     | Printronix P-Series, Epson FX80                                                                                                             |
| Fonts                 | ECMA 94                                                                                                                                     |
| Character Matrix      | 9 x 5 for draft mode<br>9 x 9 for data processing mode<br>9 x 12 for correspondance mode                                                    |
| Print speed           | P2963: 400 lpm (draft)<br>300 lpm (data)<br>90 lpm (correspondance)<br>P2966: 800 lpm (draft)<br>600 lpm (data)<br>180 lpm (correspondance) |
| Number of copies      | original + 5 (max. thickness 0.3 mm)                                                                                                        |
| Paper width           | 3 to 16 inch (76.2 to 406.4 mm)                                                                                                             |
| Paper transport       | adjustable tractors                                                                                                                         |
| Power requirements:   |                                                                                                                                             |
| Voltage (VAC)         | 120 or 240 Volt<br>50 or 60 Hz                                                                                                              |
| Power consupion       | 750 VA nominal                                                                                                                              |
| Temperature           | operational +5 to +40 °C<br>storage -40 to 70° C                                                                                            |
| Humidity              | 10% to 90% rel. non condensing                                                                                                              |
| Dimensions            | Width 864 mm<br>Depth 724 mm<br>Height 1059 mm                                                                                              |
| Weight                | 156 kg                                                                                                                                      |
| Noise                 | 67 dBA                                                                                                                                      |





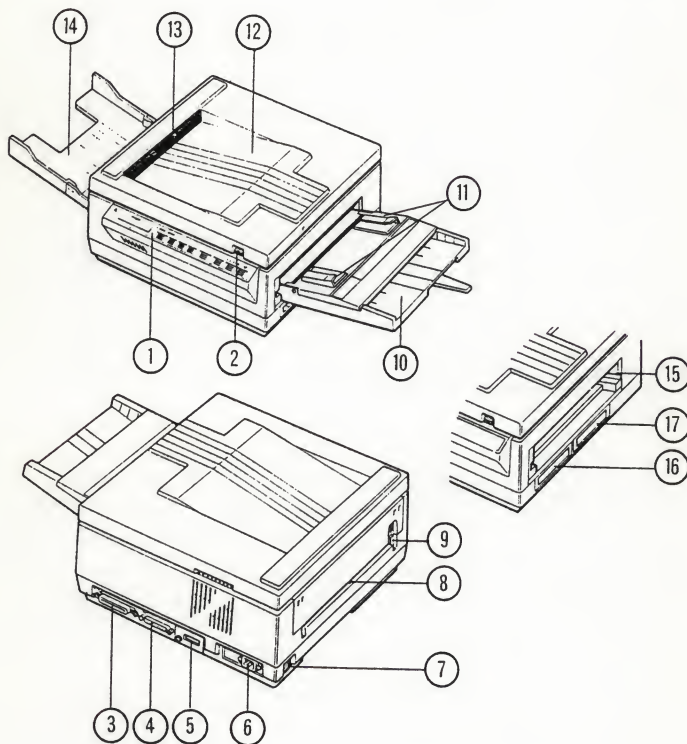
## 20.2 NMS1480 / NMS1481

The NMS1481 differs from the NMS1480 on the following points :

- Other colour
- NMS1481 has standard the HP; EPSON and IBM emulation while the NMS1480 has standard only the HP emulation.

The NMS1480 is End Commercial Delivery.

### 20.2.2 Connections



- |                                   |                                              |
|-----------------------------------|----------------------------------------------|
| 1. Operator panel                 | 10. Paper cassette                           |
| 2. Release button                 | 11. Paper guides (manual feed)               |
| 3. Parallel interface connector   | 12. "Face down" paper output tray            |
| 4. Serial interface connector     | 13. "Face down" paper out                    |
| 5. Dipswitch for serial interface | 14. "Face up" paper output tray              |
| 6. AC input                       | 15. Paper cassette input                     |
| 7. Power switch                   | 16. Cartridge input fonts and emulations (1) |
| 8. "Face up" paper output         | 17. Cartridge input fonts and emulations (2) |
| 9. Paper eject selection lever    |                                              |

## Main Controller Board

| CONNECTOR | DESCRIPTION                                                        |
|-----------|--------------------------------------------------------------------|
| CN1       | Power supply unit                                                  |
| CN2       | Relay                                                              |
| CN3       | Test switch                                                        |
| CN4       | LD drive unit                                                      |
| CN5       | High voltage power supply, feed sensor 2, thermistor               |
| CN6       | Developing voltage guide                                           |
| CN7       | Main motor                                                         |
| CN8       | Cassette feed solenoid, paper empty sensor, feed sensor 1, counter |
| CN10      | Interface controller PC board                                      |
| CN11      | Cartridges                                                         |
| CN12      | Cartridges                                                         |
| CN13      | Operation panel PC board                                           |
| CN14      | Memory board                                                       |
| CN15      | Fan (2 wires on the board)                                         |

## LD Drive Unit

| CONNECTOR | DESCRIPTION           |
|-----------|-----------------------|
| 2J1       | Main controller board |
| 2J2       | Laser diode           |
| 2J3       | Pin diode             |
| 2J4       | Polygon motor         |
| 2J5       | Discharge lamp        |

## High Voltage Power Supply

| CONNECTOR    | DESCRIPTION                     |
|--------------|---------------------------------|
| CN1          | Main controller board           |
| CN2          | Density adjuster                |
| White        | Bias                            |
| Pink         | Charger corona                  |
| Light yellow | Discharger corona               |
| Gray         | Print (transfer) charger corona |

## Interface Controller PC Board

| CONNECTOR | DESCRIPTION           |
|-----------|-----------------------|
| CN1       | Main controller board |
| CN2       | Parallel I/F          |
| CN3       | Serial I/F            |

## Operation Panel

| CONNECTOR | DESCRIPTION           |
|-----------|-----------------------|
| CN 1      | Main controller board |
| CN 2      | LCD screen            |

## Power Supply Unit

| CONNECTOR | DESCRIPTION           |
|-----------|-----------------------|
| CN 33     | Main controller board |
| CN 22     | Cover open switch     |
| CN 11     | Main switch           |
| CN 12     | Fixing unit           |



### 20.2.3 Strap Settings

#### Main Controller Board

| STRAP NAME | STRAP  | DESCRIPTION                  |
|------------|--------|------------------------------|
| J11        | open   | 1Mb memory (firmware PROM)   |
| J12        | closed | 512kb memory (firmware PROM) |
| J21        | closed | PROM (firmware PROM)         |
| J22        | open   | 1Mb mask (firmware PROM)     |
| J31        | closed | 1Mb memory (font PROM)       |
| J32        | open   | 512kb memory (font PROM)     |
| J41        | open   | PROM (font PROM)             |
| J42        | closed | 1Mb mask (font PROM)         |
| J51        | open   | option for spare clock       |
| J61        | open   | ?                            |
| J62        | open   | ?                            |
| J63        | open   | ?                            |
| J71        | open   | ?                            |
| J72        | open   | ?                            |
| J73        | open   | ?                            |

**NOTE:** All straps are hardstraps.

## Dipswitch

Dipswitch setting SW1 on main controller

| PIN NO.         | DESCRIPTION                                                      |
|-----------------|------------------------------------------------------------------|
| 8 7 6 5 4 3 2 1 |                                                                  |
| x x 0 0 x x 0 0 | Left margin (-1mm)                                               |
| x x 0 0 x x 0 1 | Left margin (0mm)                                                |
| x x 0 0 x x 1 0 | Left margin (+1mm)                                               |
| x x 0 0 x x 1 1 | Left margin (+2mm)                                               |
| x x 0 0 0 0 x x | Top margin (-1mm)                                                |
| x x 0 0 0 1 x x | Top margin (0mm)                                                 |
| x x 0 0 1 0 x x | Top margin (+1mm)                                                |
| x x 0 0 1 1 x x | Top margin (+2mm)                                                |
| x 1 1 1 0 0 0 0 | Laser on (power on) <sup>2</sup>                                 |
| x 1 1 1 0 0 0 1 | Mr. (Main, Polygon). CCH, PCH, BIAS ON <sup>1, 2</sup>           |
| x 1 1 1 0 0 1 0 | Mr. (Main, Polygon). CCH, PCH ON(Envelope) <sup>1, 2</sup>       |
| x 1 1 1 0 0 1 1 | Laser, Polygon <sup>1, 2</sup>                                   |
| x 1 1 1 0 1 0 0 | Paper feed (Heater off) <sup>1, 2</sup>                          |
| x 1 1 1 0 1 0 1 | Paper feed (Heater on) <sup>1, 2</sup>                           |
| x 1 1 1 0 1 1 0 | Test print (white) <sup>1, 2</sup>                               |
| x 1 1 1 0 1 1 1 | Test print (black) <sup>1, 2</sup>                               |
| 0 0 0 1 x x x x | Test print (lines for top + left margin adjustment) <sup>1</sup> |

**NOTE:** 1 = dip sw on  
 0 = dip sw off  
 x = dip sw on/off  
 1 = test sw on  
 2 = left, top margin ignore and no error  
 (FS1, FS2, TE, TF, DE, DVS)

Dipswitch for serial interface (see section 20.7.1 for location)

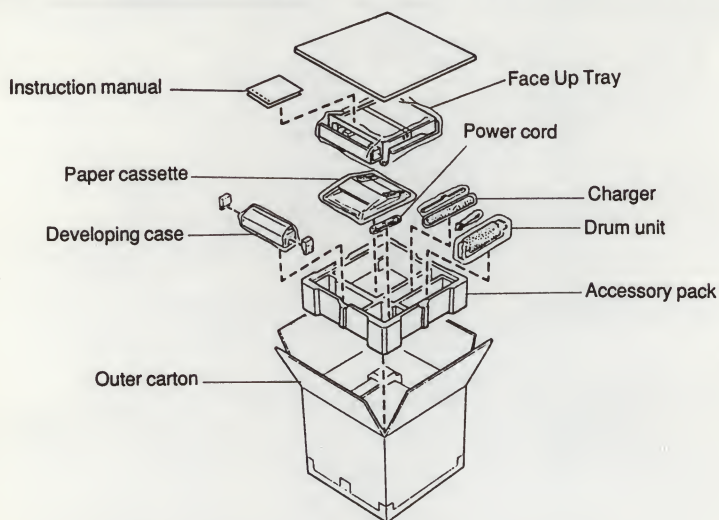
| PIN NO.         | DESCRIPTION |
|-----------------|-------------|
| 8 7 6 5 4 3 2 1 |             |
| 1 0 0 x x x x x | RS-232C     |
| 0 1 1 x x x x x | RS-422      |

**NOTE:** dipswitches 1-5 are not used

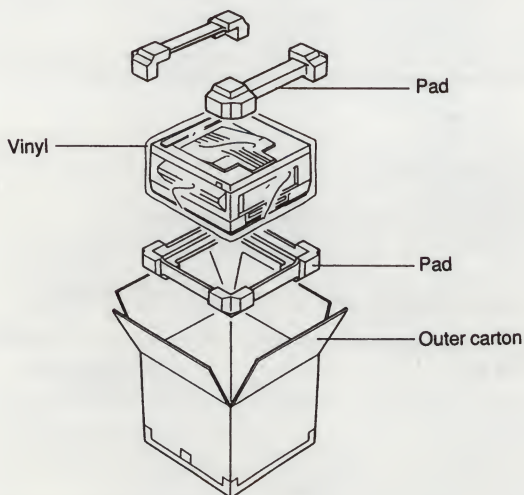
## 20.2.4 Installation

### Unpacking

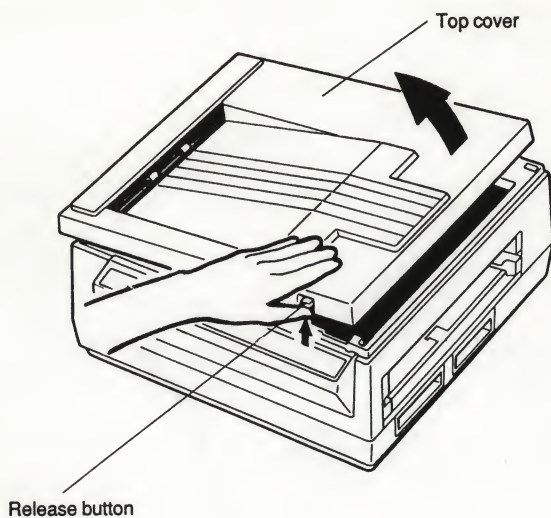
- Open the carton.
- Take out the accessory pack and confirm that the following parts are contained.



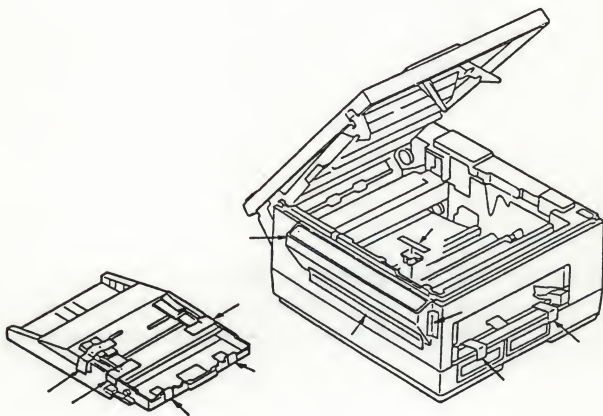
- Take the main unit out of the outer carton and remove the pads.



- Grasp the top of the printer, depress the release button, then open the top cover.



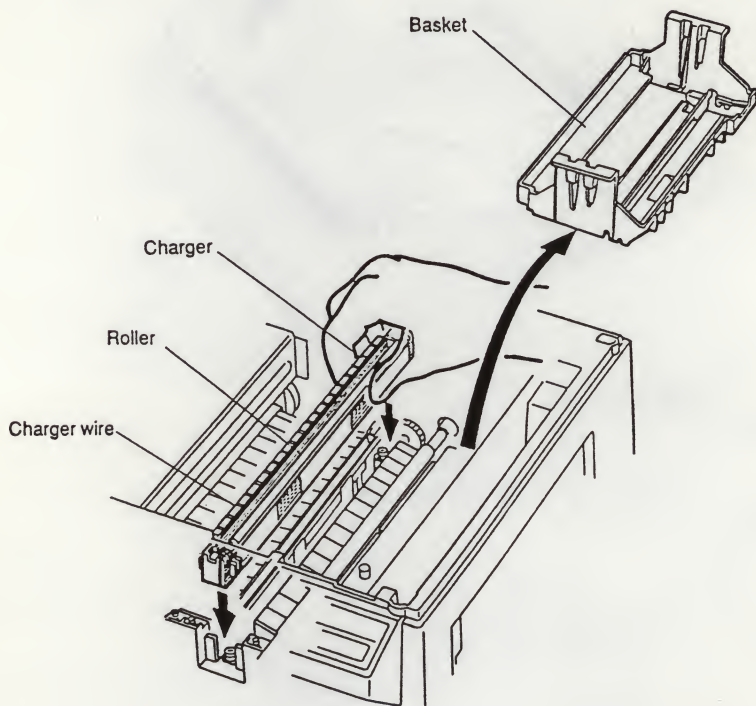
- Remove the tape and pad inside the unit.





## Transfer Charger

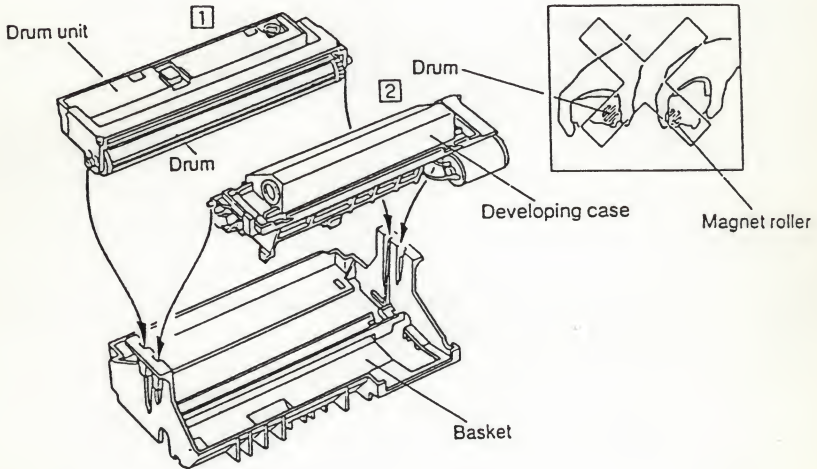
- Open the top cover and remove the basket.
- Install the charger in the base so that the roller is to the front. Avoid touching the charger wire while installing the charger.



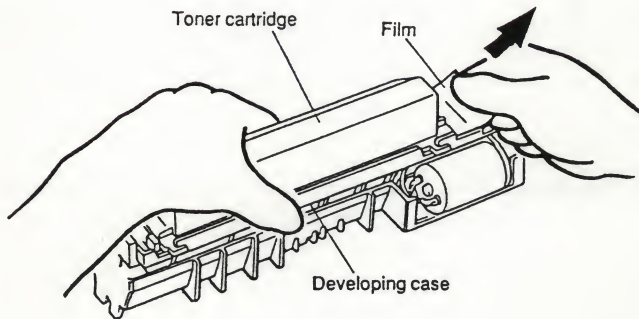
**CAUTION:** After installing the transfer charger, do not install only the basket (without the drum unit nor toner unit installed). The mylar sheet on bottom of the basket may be damaged and development cannot be performed.

## Installing the Toner / Developer Unit

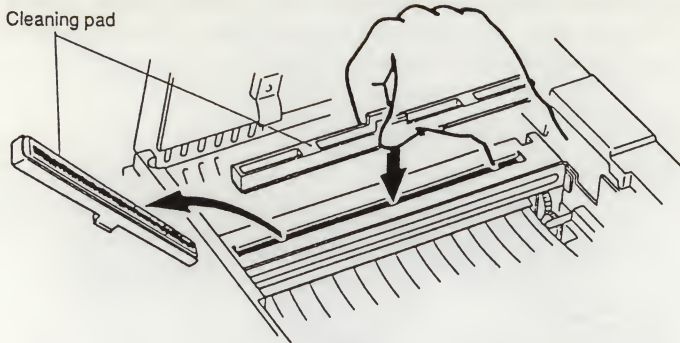
- shake the toner cartridge and the developing case horizontally several times.
- Pull the basket out of the printer and install the drum unit and developing case in the basket. Do not touch the surface of the drum or the magnet roller.



- Hold the top of the toner cartridge, then pull out the film horizontally. Take care not to touch the magnet roller by hand.

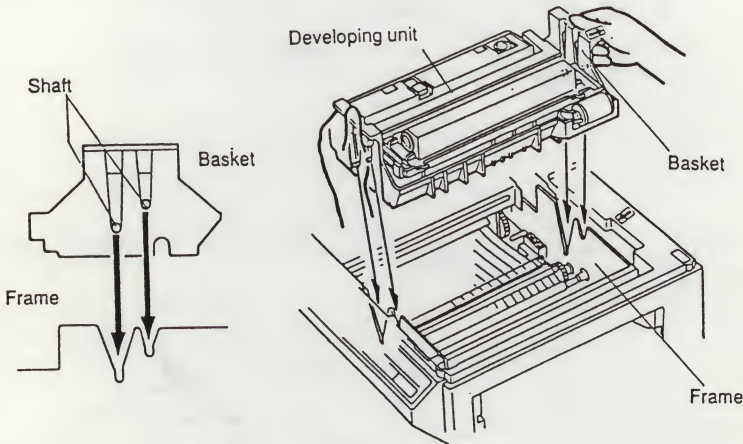


## Cleaning Pad



## Installing Basket

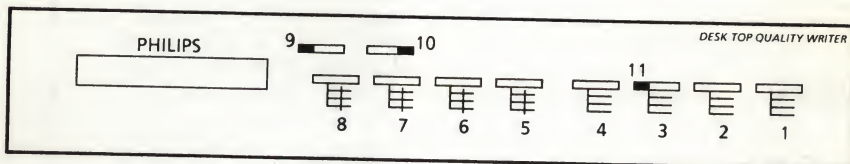
- Open the top cover, position the shafts at either end of the basket with the base frame, then install the developing unit.



**CAUTION:** Be sure that the charger is installed. And be sure that the basket and cover are installed as indicated by the arrows.

Installing Paper Cassette.  
Installing Feed Out Tray.  
Installing Interface Cable.

## Operator Panel

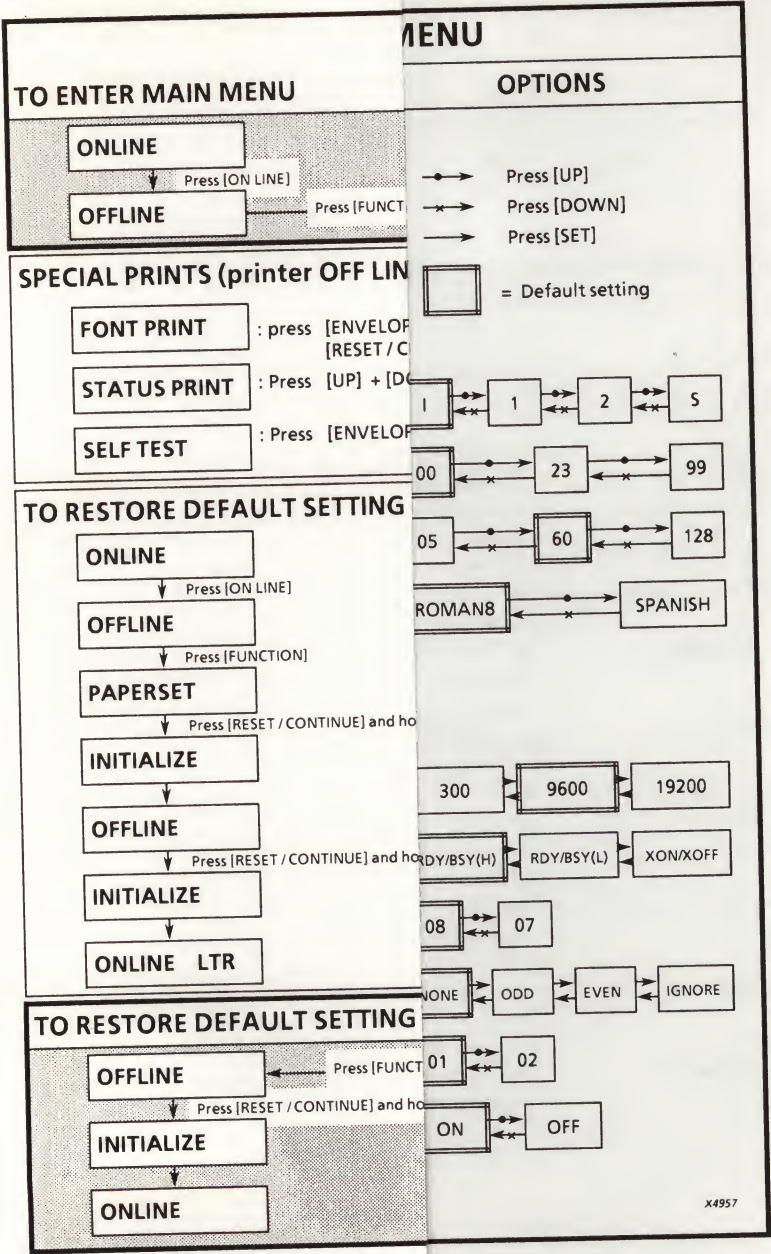


The operator panel has three indicators and eight push keys.

1. Online key : is used to alternate between online and offline modes.
2. Envelope key : is used to alternate between normal and thick paper.
3. Manual key : is used to alternate between auto paper and manual paper feed modes. This key can be used when the printer is in the offline mode.
4. Reset/Continue key : is used to set the printer defaults (holding down this key until the LCD displays "intialize" sets the printer defaults).
5. Set key : is used in setting items in the function and menu in the function setting mode. (This key sequence is ignored in the normal print mode).
6. Down key : is used to decrement the values of items in the function and menu in the function setting mode.  
(This key sequence is ignored in the normal print mode).
7. Up key : is used to increment the values of items in the function and menu in the function setting mode.  
(This key sequence is ignored in the normal print mode).
8. Function key : this key performs the function and menu and switching and setting in the function setting mode.  
(This key can only be used in the offline mode).
9. Power led : this led lights to indicate that the printer power supply is on.
10. Error led : this led lights to indicate an error state.
11. Manual led : this led lights to indicate that the printer is in manual paper feed mode.



Changing Printer Settings



## 20.2.5 Maintenance

### Test and Diagnostics

- Self test            Push envelope and manual key  
The self test checks the general functions of the printer.
- Status print        Push up and down key  
The status print gives you a complete list of the current printer settings.
- Font test            Push envelope and reset/continue key  
The font test gives you a list of the available fonts.

## Error Handling

1. 

|   |   |   |   |   |  |   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|---|---|---|---|---|--|--|--|--|
| P | A | P | E | R |  | E | M | P | T | Y |  |  |  |  |
|---|---|---|---|---|--|---|---|---|---|---|--|--|--|--|

 No paper  
Indicates that paper is exhausted.
  
2. 

|   |   |   |   |   |  |   |   |   |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|---|--|--|--|--|--|--|
| P | A | P | E | R |  | J | A | M |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|---|--|--|--|--|--|--|

 Paper jam 2 (\*1)  
Indicates a paper jam in the feed unit.
  
3. 

|   |   |   |   |   |   |   |   |   |  |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|
| I | N | S | E | R | T | I | O | N |  | E | R | R | O | R |
|---|---|---|---|---|---|---|---|---|--|---|---|---|---|---|

 Paper jam 1  
This indicates a malfunction in the paper pickup from the paper cassette.
  
4. 

|   |   |   |   |   |   |  |   |   |   |   |  |  |  |  |
|---|---|---|---|---|---|--|---|---|---|---|--|--|--|--|
| C | H | A | N | G | E |  | D | R | U | M |  |  |  |  |
|---|---|---|---|---|---|--|---|---|---|---|--|--|--|--|

 Change Drum (\*2)  
Indicates that the drum must be replaced.
  
5. 

|   |   |   |   |   |  |   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|---|---|---|---|---|--|--|--|--|
| T | O | N | E | R |  | E | M | P | T | Y |  |  |  |  |
|---|---|---|---|---|--|---|---|---|---|---|--|--|--|--|

 Toner Empty (\*2)  
This indicates that the toner is low and must be replenished.
  
6. 

|   |   |   |   |   |  |   |   |   |   |  |  |  |  |  |
|---|---|---|---|---|--|---|---|---|---|--|--|--|--|--|
| C | O | V | E | R |  | O | P | E | N |  |  |  |  |  |
|---|---|---|---|---|--|---|---|---|---|--|--|--|--|--|

 Cover open  
Indicates that the cover is open.
  
7. 

|   |   |   |   |  |   |   |   |   |  |   |   |   |   |   |
|---|---|---|---|--|---|---|---|---|--|---|---|---|---|---|
| F | O | N | T |  | C | A | R | T |  | E | R | R | O | R |
|---|---|---|---|--|---|---|---|---|--|---|---|---|---|---|

  
Indicates that the cartridge selected for the current font (F&M) is not inserted (no FONT SET selected when printing.)

## Error Handling (continued)

8. 

|   |   |   |   |   |  |   |   |   |   |  |   |   |   |   |   |
|---|---|---|---|---|--|---|---|---|---|--|---|---|---|---|---|
| P | A | P | E | R |  | S | I | Z | E |  | E | R | R | O | R |
|---|---|---|---|---|--|---|---|---|---|--|---|---|---|---|---|

  
 Indicates that the F & M paper-size setting is not the same as the size of paper loaded in the cassette.
  
9. 

|   |   |   |  |   |   |   |   |   |  |  |  |  |  |  |  |
|---|---|---|--|---|---|---|---|---|--|--|--|--|--|--|--|
| C | P | U |  | E | R | R | O | R |  |  |  |  |  |  |  |
|---|---|---|--|---|---|---|---|---|--|--|--|--|--|--|--|

  
 Indicates a calculation error in the printer CPU.
  
10. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 1 | 0 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

  
 Indicates an error in the program ROM.
  
11. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 1 | 1 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

FONT ROM  
Checksum error

  
 Indicates a checksum error for the font cartridge or emulation cartridge (except for HP font cartridges.)
  
12. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 1 | 2 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

RAM error

  
 Indicates a RAM read/write error
  
13. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 2 | 0 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

Memory overflow  
error

  
 Indicates a user-area memory overflow when downloading or storing macros in memory
  
14. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 2 | 1 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

Print Overrun Error

  
 Indicates that print data overran the printing operation



## Error Handling (continued)

15. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 2 | 2 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

 Receive Buffer Overflow error  
Indicates that the overrun value set during setup (F & M) has been exceeded by received data.
16. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 3 | 0 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

 Memory Error  
Indicates a memory error
17. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 3 | 1 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

 Polygon Motor Synchronous Error  
Indicates a polygon motor synchronism error.
18. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 3 | 2 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

 Heater Error  
Indicates a heater error.
19. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 3 | 3 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

 Thermistor Error  
Indicates a thermistor error.
20. 

|   |   |   |   |   |  |   |   |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|
| E | R | R | O | R |  | 4 | 0 |  |  |  |  |  |  |  |  |
|---|---|---|---|---|--|---|---|--|--|--|--|--|--|--|--|

 Parity/Framing Error  
Indicates that a parity/framing error occurred when using the serial interface.

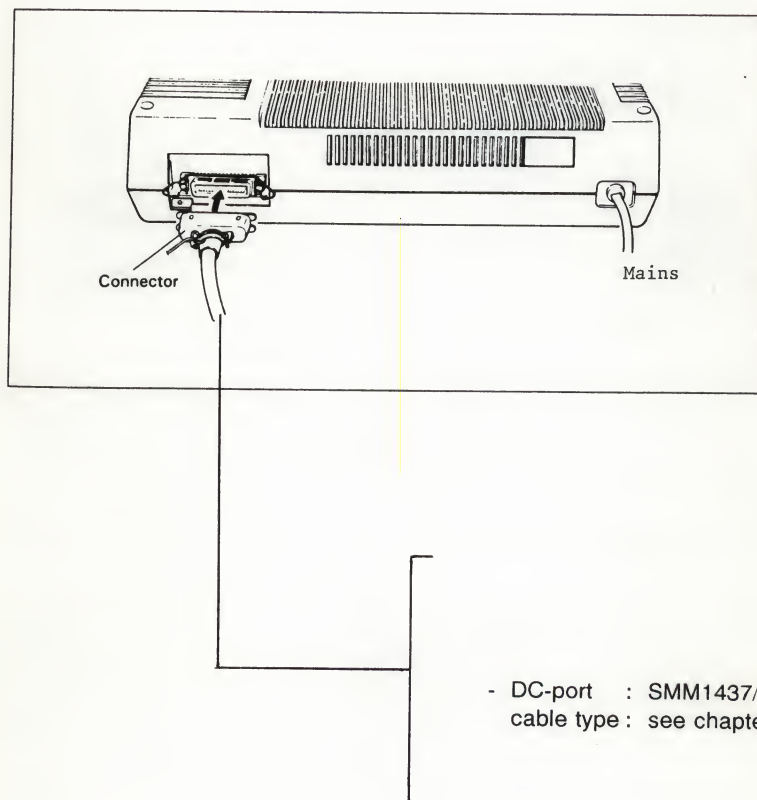
## Error Clear Function

- 10 ERROR, 11 ERROR, 12 ERROR, 30 ERROR, 31 ERROR, 32 ERROR, 33 ERROR will not clear error condition before Power OFF.
- 20 ERROR, 21 ERROR, 22 ERROR, 40 ERROR, PAPER SIZE ERROR have two ways to clear Error condition, one is AUTO CONT = ON. The Printer indicates Error message 10 second, then clears Error condition by itself. The other is AUTO CONT = OFF mode. This mode keeps Error condition before RESET Key is enter.
- PAPER JAM, INSERTION ERROR, CHANGE DRUM, TONER EMPTY, COVER OPEN are cleared automatically after the cause of the error is cleared and printer cover is cleared.
- PAPER EMPTY and FONT CARTRIDGE ERROR are cleared automatically after the error is cleared.

## 20.3 P2908/P2909 (EPSON FX800/FX1000)

The P2908-70x Epson FX800 and the P2909-70x Epson FX1000 are End of Commercial Delivery.

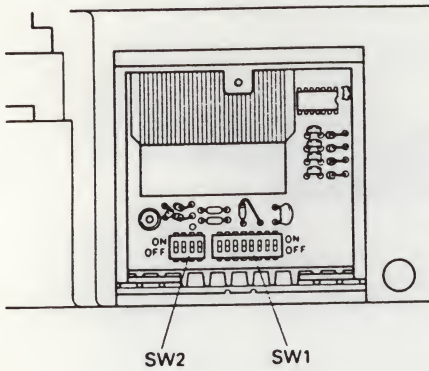
### 20.3.2 Connections



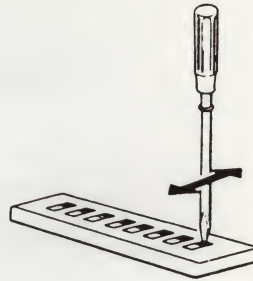
### 20.3.3 Strap Settings

#### Switch Locations

#### Parallel Interface Board



Location of DIP Switches



Setting DIP Switches

#### Default Setting SW1 AND SW2



# Epson FX800 (P2908) and FX1000 (P2909)

## Parallel Interface Dip Switch 1

| SWITCH | SETTING     | FUNCTION                                              |                                          |
|--------|-------------|-------------------------------------------------------|------------------------------------------|
|        |             | FX80/FX100                                            | FX85/FX105 FX80 +/FX100 +                |
| 1      | On<br>* Off | Power-on condensed print<br>Power-on PICA size print  | Idem                                     |
| 2      | On<br>* Off | Zero font 0<br>Zero font 0                            | Idem                                     |
| 3      | On<br>* Off | Paper end detect invalid<br>Paper end detect valid    | Idem                                     |
| 4      | * On<br>Off | Input buffer enabled<br>Input buffer disabled         | ESC/P control codes<br>IBM control codes |
| 5      | On<br>* Off | Power-on Emphasized print<br>Power-on PICA size print | Bold print<br>Normal print               |

| SWITCH |     |     | NATIONAL<br>VERSION |
|--------|-----|-----|---------------------|
| 6      | 7   | 8   |                     |
| On     | On  | On  | U.S.A.              |
| On     | On  | Off | France              |
| On     | Off | On  | Germany             |
| * On   | Off | Off | U.K.                |
| Off    | On  | On  | Denmark             |
| Off    | On  | Off | Sweden              |
| Off    | Off | On  | Italy               |
| Off    | Off | Off | Spain               |

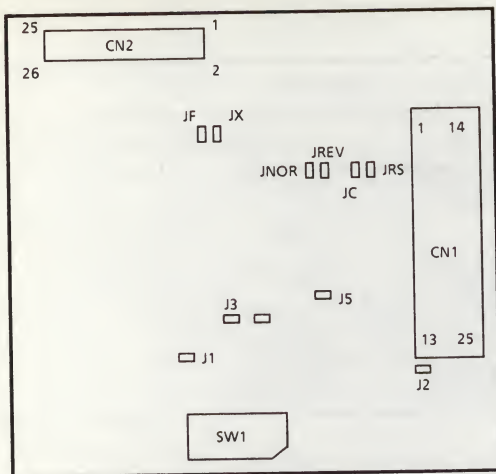
## Dip Switch 2

| SWITCH | SETTING     | FUNCTION                                          |                                                      |
|--------|-------------|---------------------------------------------------|------------------------------------------------------|
|        |             | FX80/FX100                                        | FX85/FX105 FX80 +/FX100 +                            |
| 1      | * On<br>Off | Select in-n signal fixed<br>Select in-n not fixed | Idem                                                 |
| 2      | On<br>* Off | Buzzer valid<br>Buzzer invalid                    | Sheetfeeder mode select<br>Sheetfeeder mode deselect |
| 3      | ON<br>* Off | 1" skip over valid<br>1" skip over invalid        | Idem                                                 |
| 4      | On<br>* Off | Automatic LF with CR<br>No automatic LF with CR   | Idem                                                 |

\* Default Setting



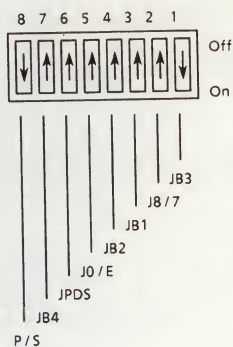
## Serial Interface Board



Standard Strapsetting P9000m

9600 B/S

SW1



### Jumper Setting

| Jumper | Function |                                                                                   |     |                                                                                    | Factory-set condition |
|--------|----------|-----------------------------------------------------------------------------------|-----|------------------------------------------------------------------------------------|-----------------------|
| J1     | On:      | Pull up "TTY-TXD" to +12V via 470Ω resistor                                       |     |                                                                                    | Off                   |
| J2     | On:      | Connect "TTY-TXD Return" to Signal Ground                                         |     |                                                                                    | Off                   |
| J3     | On:      | Pull up "TTY-TXD" to +12V via 470Ω resistor                                       |     |                                                                                    | Off                   |
| J4     | On:      | Connect "TTY-TXD Return" to Signal Ground                                         |     |                                                                                    | Off                   |
| J5     | On:      | Pull up "DSR" and "DCD" to +12V via 4.7kΩ resistor                                |     |                                                                                    | On                    |
| JRS    | On       | Input data:                                                                       | Off | Input data:                                                                        | On                    |
| JC     | Off      | RS-232C level                                                                     | On  | Current loop level                                                                 | Off                   |
| JNOR   | Off      | In the state that serial data entry is disabled. Reverse Channel = MARK (RS-232C) | Off | In the state that serial data entry is disabled. Reverse Channel = SPACE (RS-232C) | On                    |
| JREV   | On       | TTY-TXD = SPACE (Current loop)                                                    | On  | TTY-TXD = MARK (Current loop)                                                      | Off                   |
| JF     | On       | When a reverse channel flag is output to TTY-TXD (current loop)                   | Off | When X-ON or X-OFF signal is output to TTY-TXD (Current loop)                      | On                    |
| JX     | Off      |                                                                                   | On  |                                                                                    | Off                   |

#### NOTES:

- 1 "On" denotes the connection of the jumper, while "Off" denotes the disconnection of the jumper
- 2 Either RS-232C level or current loop level is selectable but never both.
- 3 DSR and DCD of J5 are connected to SLCT IN of the printer through the line receiver 75189

## Serial Interface Dip Switch 1

| SWITCH | SETTING     | FUNCTION                                     |
|--------|-------------|----------------------------------------------|
| 1      |             | Baud rate, see table below                   |
| 2      | On<br>* Off | 7 bit word<br>8 bit word                     |
| 3      |             | Baud rate, see table below                   |
| 4      |             | Baud rate, see table below                   |
| 5      | On<br>* Off | Even parity<br>Odd parity                    |
| 6      | On<br>* Off | Parity enabled<br>Parity disabled            |
| 7      |             | Baud rate, see table below                   |
| 8      | * On<br>Off | Serial mode enabled<br>Parallel mode enabled |

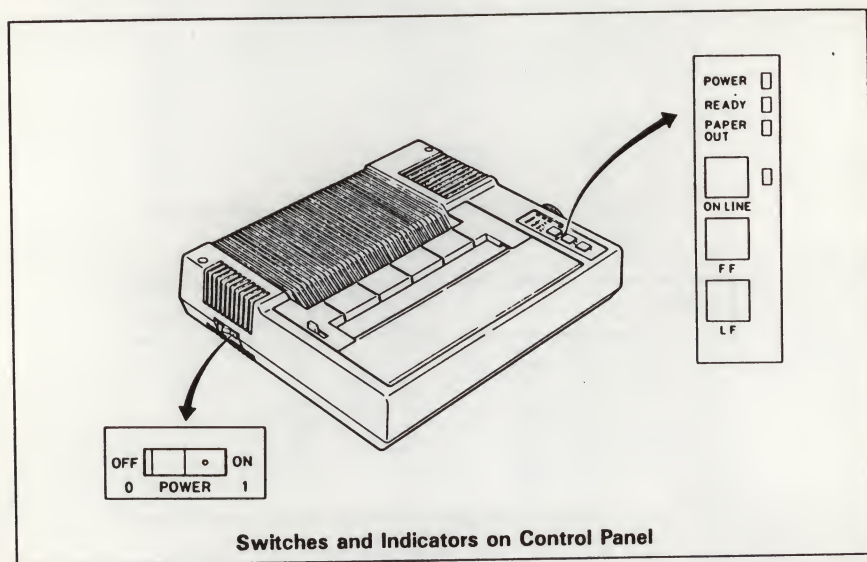
| BAUD RATE | SW1 - 7 | SW1 - 1 | SW1 - 4 | SW1 - 3 |
|-----------|---------|---------|---------|---------|
| 75        | On      | On      | On      | On      |
| 110       | On      | On      | On      | Off     |
| 300       | On      | Off     | On      | Off     |
| 600       | On      | Off     | Off     | On      |
| 1200      | On      | Off     | Off     | Off     |
| 2400      | Off     | On      | On      | Off     |
| 4800      | Off     | On      | Off     | On      |
| 9600      | Off     | On      | Off     | Off     |
| 19200     | Off     | Off     | On      | On      |

If the P2809/P2909 is connected to the printer port of a TM220, the Printer Communication Set-Up should be:

Speed = 9600  
 Normal Print Mode  
 8 Bits, No Parity  
 1 Stop Bit  
 Print Full Page  
 Print National Only  
 No Terminator

## 20.3.4 Installation

### Operation



**POWER:** Illuminates while the printer is receiving AC power.  
**READY:** Illuminates when the printer is ready to receive data.  
**PAPER OUT:** Illuminates when the paper supply is near its end.  
**ON LINE:** Illuminates when the printer is in the ON-LINE mode.

## 20.3.5 Maintenance

### Test and Diagnostics

When one of the following errors occur, the buzzer also sounds as follows:

1. Pee, Pee, Pee, Pee : Short circuit between the collector and emitter has occurred. (4 long pip sounds).
2. Pi, Pi, Pi, Pee : Abnormally high voltage is detected. (3 short and 1 long pip sounds).
3. Pi, Pi, Pi, Pi, Pi, Pi : An error has occurred in the slave CPU (3 continuous short pip sounds repeated twice with a pause).
4. Pi, Pi, Pi, Pi : Paper-end status is detected. (4 continuous short pip sounds repeated 5 times)  
(repeat 5 times) repeated 5 times with a pause).

### Self-Test

The self-test function is preprogrammed in the printer's circuitry and can be performed by turning the POWER switch ON while depressing the LF switch. All characters provided by the internal software are printed out on the paper.

### Result

The FX-800 has a self-test (self-diagnostic) function to check the following:

- (1) Print head operation and printing quality.
- (2) Operation of the printer mechanism (motor, cartridge ribbon mechanism, drive belt, etc.).



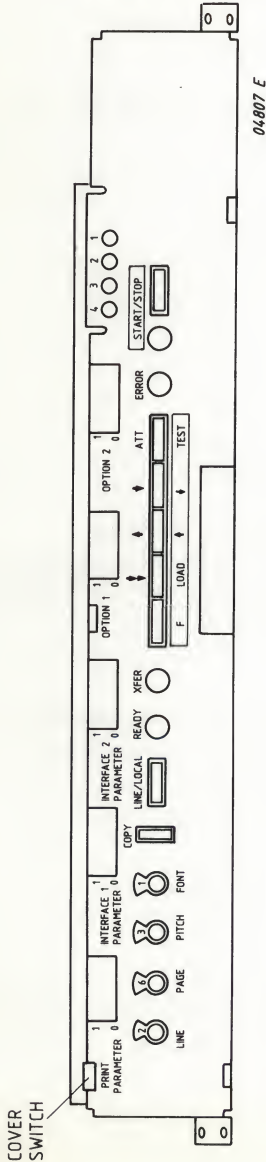


## 20.4 P2934 (GP300)

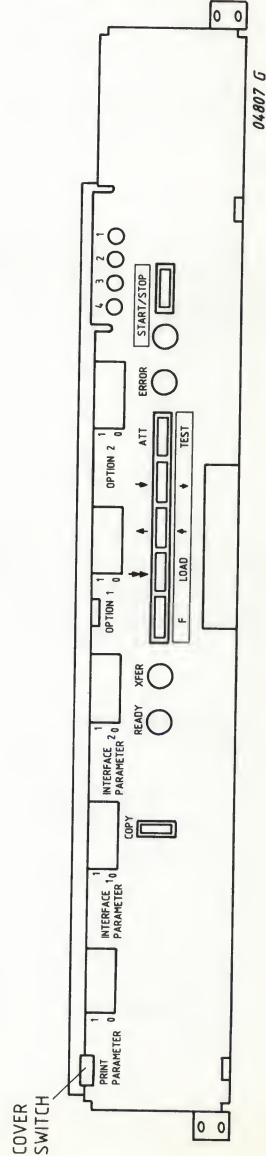
The P2934 General Printer GP300 is End Commercial Delivery.

### 20.4.3 Strap Setting

1. Operator Panel L  
5112 291 77710



2. Operator Panel S  
5112 291 77700



## Rotary Switches Operator Panel 2

### Line Switch

| SWITCH POSITION | PAGE LENGTH (INCHES) |
|-----------------|----------------------|
| 1               | 3                    |
| 2               | 4                    |
| 3               | 6* (default)         |
| 4               | 8                    |
| 5               | 12                   |

\* All other switch positions correspond to switch position 3 (6 lines per inch).

### Page-Switch

| SWITCH POSITION | LINES PER INCH |
|-----------------|----------------|
| 1               | 4              |
| 2               | 4 1/6          |
| 3               | 6*             |
| 4               | 8              |
| 5               | 8 1/2          |
| 6               | 11             |
| 7               | 12             |
| 8               | 11 2/3 **      |

\* All other switch positions correspond to switch position 7 (12 inches).

\*\* This switch position is only valid if printer is equipped with microprogram release level 21/22 or higher. (If printer is not equipped with this microprogram release level, switch position 8 corresponds to switch position 7)

### Pitch-Switch

| SWITCH POSITION | PITCH = CHAR./INCH   | SWITCH POSITION | PITCH = CHAR./INCH   |
|-----------------|----------------------|-----------------|----------------------|
| 1               | 10 (default)         | 4               | p = proportional 1 * |
| 2               | 12                   | 5               | p = proportional 1 * |
| 3               | 15                   | 6               | 14,4                 |
| 4               | p = proportional 1 * | 7               | 18                   |

\* Space width defined by the character generator.

**NOTE:** All other switch positions correspond to switch position 1 (10 characters per inch).

## Font-Switch

| SWITCH POSITION | FONT MATRIX |                  |                                                             |
|-----------------|-------------|------------------|-------------------------------------------------------------|
| 1               | 9 x 9       | Data<br>Gothic } | Standard<br>Character Generators                            |
| 2               | 18 x 25     |                  |                                                             |
| 3               |             | }                | Additional<br>Character Generator<br>(available as options) |
| 4               |             |                  |                                                             |
| .               |             |                  |                                                             |
| .               |             |                  |                                                             |
| 9               |             |                  |                                                             |

**NOTE:** When additional character generators are not mounted, switch positions 3 to 9 correspond to switch position 1.



# Print Parameter DIP Switch block 1

DEFAULT SETTING FOR P9000m



| PARAMETERS       |        | SWITCHES |    |    |    |    |    |    |    |    |  |
|------------------|--------|----------|----|----|----|----|----|----|----|----|--|
|                  |        |          | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 |  |
| National Version | D/A    | 1        | ●  | ○  | ○  | ○  |    |    |    |    |  |
|                  | GB/NL  | 2        | ○  | ●  | ○  | ○  |    |    |    |    |  |
|                  | F      | 3        | ●  | ●  | ○  | ○  |    |    |    |    |  |
|                  | E      | 4        | ○  | ○  | ●  |    |    |    |    |    |  |
|                  | I      | 5        | ●  | ○  | ●  |    |    |    |    |    |  |
|                  | S      | 6        | ○  | ●  | ●  |    |    |    |    |    |  |
|                  | DK/N   | 7        | ●  | ●  | ●  |    |    |    |    |    |  |
|                  | P      | 8        | ○  | ○  | ○  | ●  |    |    |    |    |  |
| *                | YU     | 9        | ●  | ○  | ○  | ●  |    |    |    |    |  |
|                  | USA    | 10       | ○  | ●  | ○  | ●  |    |    |    |    |  |
|                  | S(SIS) | 11       | ●  | ●  | ○  | ●  |    |    |    |    |  |
| ASSH - Hopper    |        |          |    |    |    |    | ●  |    |    |    |  |
| ASSH - Manual    |        |          |    |    |    |    | ○  |    |    |    |  |
| Left Margin 8    |        |          |    |    |    |    |    | ●  |    |    |  |
| Left Margin 1    |        |          |    |    |    |    |    | ○  |    |    |  |
| High Speed       |        |          |    |    |    |    |    |    | ●  |    |  |
| Normal Speed     |        |          |    |    |    |    |    |    | ○  |    |  |
| Dump Mode * *    |        |          |    |    |    |    |    |    |    | ●  |  |
| Normal           |        |          |    |    |    |    |    |    |    | ○  |  |

SW1-4 not effective for teletex IBM character generator.

On ●  
Off ○

\* Depends on character generator version, else SWF.

\*\* Only effective after switching OFF/ON.

# Operator Panel (IF1)

## Interface Parameter 1 DIP Switch block 2

DEFAULT SETTING FOR P9000m



| PARAMETERS                              |          | SWITCHES |    |    |    |    |    |    |    |
|-----------------------------------------|----------|----------|----|----|----|----|----|----|----|
|                                         |          | #1       | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| X-ON X-OFF Protocol *** Full Duplex     |          | •        |    |    |    |    |    |    |    |
| READY BUSY DTR Protocol *** Half Duplex |          | o        |    |    |    |    |    |    |    |
| Autostatus Report                       | NO       |          | •  |    |    |    |    |    |    |
|                                         | YES      |          | o  |    |    |    |    |    |    |
| Parity *                                | Odd      |          |    | •  |    |    |    |    |    |
|                                         | Even     |          |    | o  |    |    |    |    |    |
| Data Bits                               | 7        |          |    |    | •  |    |    |    |    |
|                                         | 8        |          |    |    | o  |    |    |    |    |
| Parity Check                            | NO *     |          |    |    |    | •  |    |    |    |
|                                         | YES      |          |    |    |    | o  |    |    |    |
| Baud Rate                               | 19200 ** |          |    |    |    |    | •  | •  | •  |
|                                         | 9600     |          |    |    |    |    | o  | o  | o  |
|                                         | 4800     |          |    |    |    |    | •  | o  | o  |
|                                         | 2400     |          |    |    |    |    | o  | •  | o  |
|                                         | 1200     |          |    |    |    |    | •  | •  | o  |
|                                         | 600      |          |    |    |    |    | o  | o  | •  |
|                                         | 300      |          |    |    |    |    | •  | o  | •  |

On •  
Off o

\* If switch 5 = ON

Switch 3 = ON means character with parity bit

Switch 3 = OFF means character without parity bit

\*\*\* Only in case of ACK/NAK protocol

## Interface Parameter 2 DIP Switch block3

DEFAULT SETTING FOR P9000m



Switches 1 until 7 all off.

Switch 8 = ON → 2k EXT. BUFFER EXTRA.

Switch 8 = OFF → NO EXT. BUFFER.

# Option 1 Parameter DIP Switch block4

DEFAULT SETTING FOR P9000m



| PARAMETERS                | SWITCHES |    |    |    |    |    |    |    |
|---------------------------|----------|----|----|----|----|----|----|----|
|                           | #1       | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| NOT USED                  | 0        |    |    |    |    |    |    |    |
| Auto Line Feed ON *       |          | •  |    |    |    |    |    |    |
| OFF*                      |          | 0  |    |    |    |    |    |    |
| Auto Carriage Return ON * |          |    | •  |    |    |    |    |    |
| OFF*                      |          |    | 0  |    |    |    |    |    |
| GP100 150                 |          |    |    | •  |    |    |    |    |
| GP300 300L GP480 480L     |          |    |    | 0  |    |    |    |    |
| Platen Width 400mm GP480L |          |    |    |    | •  |    |    |    |
| 340mm GP480               |          |    |    |    | 0  |    |    |    |
| 9-Needle Printhead        |          |    |    |    |    | •  |    |    |
| 18-Needle Printhead       |          |    |    |    |    | 0  |    |    |
| Tractor Feed Only **      |          |    |    |    |    |    | •  |    |
| Universal **              |          |    |    |    |    |    | 0  |    |
| Paper Run Check YES       |          |    |    |    |    |    |    | •  |
| NO                        |          |    |    |    |    |    |    | 0  |

On •  
Off 0

\* Only valid since release 21/22

For previous releases switch 2 and 3 are used for needle correction

\*\* Only for panel 4 and 7



## Option 2 Parameter

DEFAULT SETTING FOR P9000m



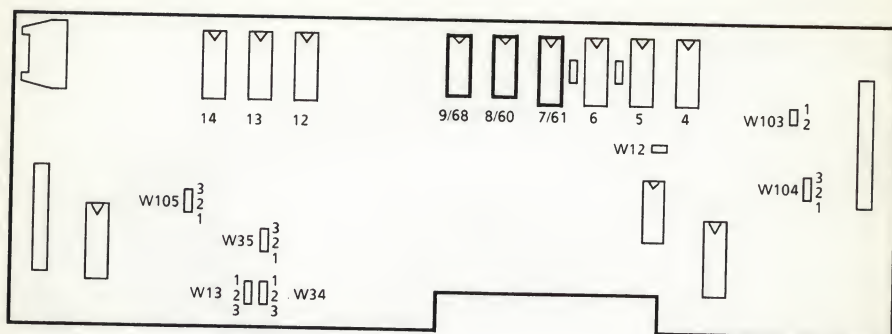
\* FACTORY SETTED  
DO NOT CHANGE

| PARAMETERS              |                | SWITCHES |    |    |    |    |    |    |    |
|-------------------------|----------------|----------|----|----|----|----|----|----|----|
|                         |                | #1       | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| Needle Correction       | (-)            | •        |    |    |    |    |    |    |    |
|                         | (+)            | o        |    |    |    |    |    |    |    |
| Needle Correction Value | 2 <sup>0</sup> |          | •  |    |    |    |    |    |    |
|                         |                |          | o  |    |    |    |    |    |    |
|                         | 2 <sup>1</sup> |          |    | •  |    |    |    |    |    |
|                         |                |          |    | o  |    |    |    |    |    |
|                         | 2 <sup>2</sup> |          |    |    | •  |    |    |    |    |
|                         |                |          |    |    | o  |    |    |    |    |
| NOT USED                |                |          |    |    |    | o  |    |    |    |
| NOT USED                |                |          |    |    |    |    | o  |    |    |
| Printhead RDY Control   | ON *           |          |    |    |    |    |    | •  |    |
|                         | OFF            |          |    |    |    |    |    | o  |    |
| Copy Switch             | ENABLE         |          |    |    |    |    |    |    | •  |
|                         | DISABLE        |          |    |    |    |    |    |    | o  |

On •  
Off o

\* Only since release 22/23

# Strap Settings PCB CU3



X2853

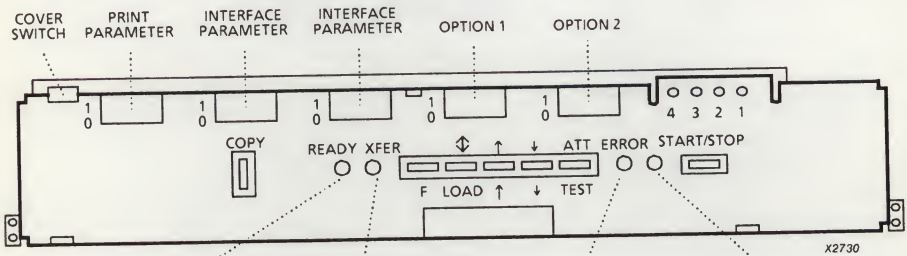
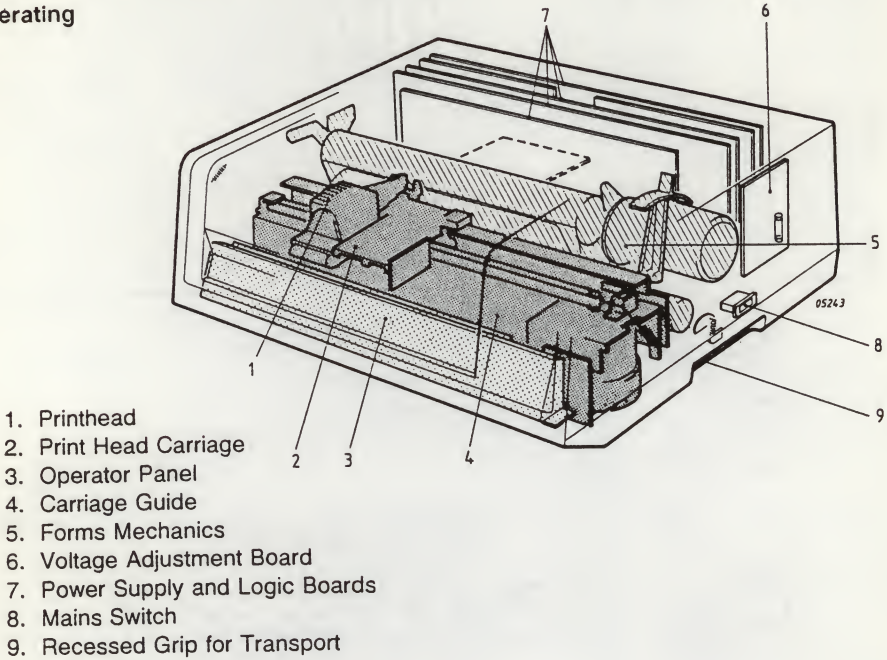
| STRAP | POSITION | PURPOSE                                   |
|-------|----------|-------------------------------------------|
| W12   | 1-2      | Device with copy control                  |
| W13   | 1-2      | SYNCH. TRANSM. 115 = 113 = RxC. iFa)      |
|       | 3-2 *    | Normal, BRCLK = 113                       |
| W34   | 1-2 *    | 109 Not used                              |
|       | 3-2      | 109 Used                                  |
| W35   | 1-2      | SYNCH. TRANSM. 115 = RxC = TxC iFa)       |
|       | 3-2      | SYNCH. TRANSM. 114 = TxC 115 = RxC iFa)   |
| W103  | 1-2 *    | Test                                      |
| W104  | 1-2      | IC7 = 64K CHAR. GEN. (IC8 not mounted)    |
|       | 3-2      | IC7 = 32K CHAR. GEN. (IC8 may be mounted) |
| W105  | 1-2      | IC13 = 64K PROM mounted (BMR, ACK/NAK)    |
|       | 2-3      | IC13 = 32K PROM mounted OR 0-32K part of  |
|       |          | 64K PROM will only be used for            |
|       | 2-3      | TTY, SDI, Ready/Busy, Xon/Xoff            |

\* = FACTORY INSTALLED

## 20.4.4 Installation

See CE-manual General Printer (GP) for detailed instructions concerning the installation.

### Operating



(GREEN)  
Lit when the printer is ready to receive or transmit data via the interface

(Orange Or Green)  
Lit when data is being transmitted or received

(Yellow)  
Lit when paper error is detected

- 1 Paper low
- 2 Paper run error
- 3 Hopper empty
- 4 Stacker full
- 5 No card in FF

Only after Online Commands

(Yellow)  
Lit when printer is in the stop mode

## 20.4.5 Maintenance

### Off-Line Printer Test

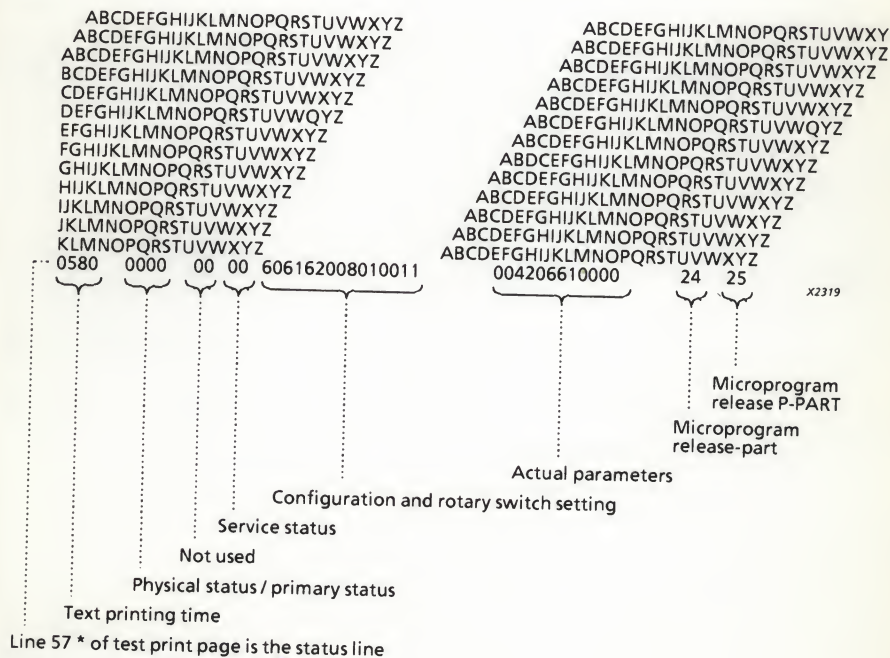
#### Starting/Stopping the Off-Line Test Platen Feed

- Switch PRINTER ON.
- Press the START/STOP button.
- Check that the START/STOP lamp is lit, if not press START/STOP button again.
- Press keys F and TEST together.
- Press START/STOP button, the printhead moves to the left and opens catch flaps of the INSERTER. ERROR and STOP lamp lit.
- Load paper into the paper support and press START/STOP button. The paper will be inserted and the OFF-LINE TEST starts printing.
- When F and TEST key are pressed simultaneously the OFF-LINE TEST will be switched off (STOPPED).

The print-out of the off-line test consists of 57\* is the status line.

#### Status Line Decoding

The Status Line is printed at the end of each page which is printed in the off line test mode.



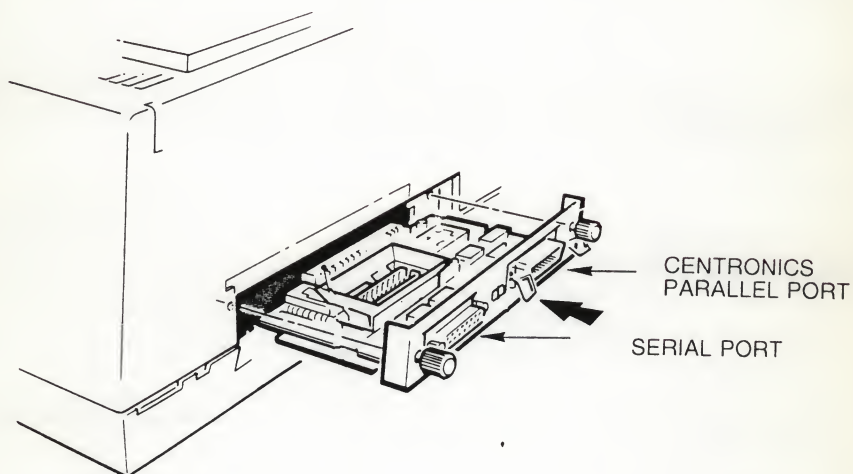




## 20.5 P2936 (GP310)

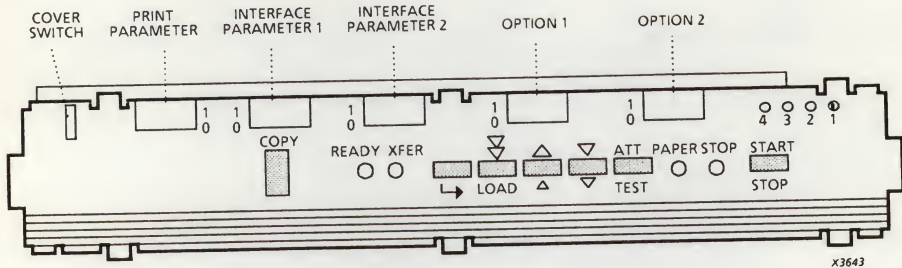
The P2936-100 GP310 with small panel and the P2936-200 GP310F with small panel are End Commercial Delivery.

### 20.5.2 Connections

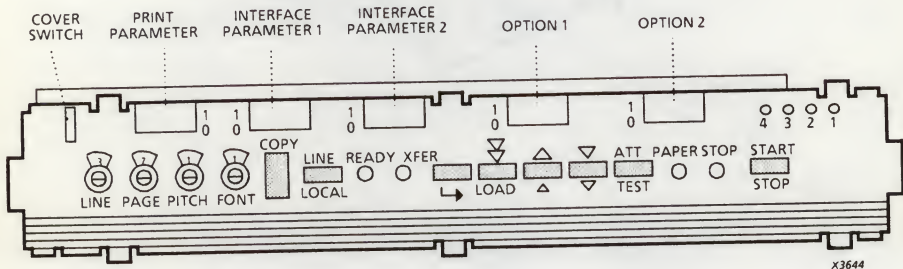


## 20.5.3 Strap Setting

### Standard Operator Panel (Operator Panel 1)



### Extended Operator Panel (Operator Panel 2)



### Rotary Switches Operator Panel 2

#### Line Switch

| SWITCH POSITION | PAGE LENGTH (INCHES) |
|-----------------|----------------------|
| 1               | 3                    |
| 2               | 4                    |
| 3               | 6* (default)         |
| 4               | 8                    |
| 5               | 12                   |

\* All other switch positions correspond to switch position 3 (6 lines per inch).

## Page-Switch

| SWITCH POSITION | LINES PER INCH |
|-----------------|----------------|
| 1               | 4              |
| 2               | 4 1/6          |
| 3               | 6              |
| 4               | 8              |
| 5               | 8 1/2          |
| 6               | 11             |
| 7               | 12 (default)   |
| 8               | 11 2/3         |

Switch position 0 and 9 correspond to switch position 7 (12 inches).

## Pitch-Switch

| SWITCH POSITION | PITCH = CHAR./INCH   | SWITCH POSITION | PITCH = CHAR./INCH   |
|-----------------|----------------------|-----------------|----------------------|
| 1               | 10 (default)         | 4               | p = proportional 1 * |
| 2               | 12                   | 5               | p = proportional 1 * |
| 3               | 15                   | 6               | 14,4 * *             |
| 4               | p = proportional 1 * | 7               | 18 * *               |

- \* Proportional spacing is not possible on the GP310, i.e. switch position 4 corresponds to switch position 1 (10 characters per inch).
- \* \* Only possible for data (draft) quality.

**NOTE:** All other switch positions correspond to switch position 1 (mostly 10 characters per inch).

## Font-Switch

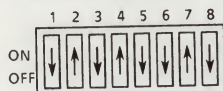
| SWITCH POSITION | FONT MATRIX |               |
|-----------------|-------------|---------------|
| 1               | 9 x 9       | Data          |
| 2               | 18 x 25     | Letter Gothic |
|                 |             | } Standard    |
|                 |             | } Character   |
|                 |             | Generators    |

**NOTE:** When no Font Module is mounted rotary switch positions 7 to 0 correspond to switch position 1. Else additional fonts 7 etc. can be possible after loading character fonts in the Font Module (RAM).



# Print Parameter DIP Switch block 1

Default setting for P9000 m-system



| PARAMETERS              |               | SWITCHES |    |    |    |    |    |    |    |    |
|-------------------------|---------------|----------|----|----|----|----|----|----|----|----|
|                         |               |          | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| National Version        | Germany       | 1        | ●  | ○  | ○  | ○  |    |    |    |    |
|                         | Great Britain | 2        | ○  | ●  | ○  | ○  |    |    |    |    |
|                         | Netherlands   | 3        | ●  | ●  | ○  | ○  |    |    |    |    |
|                         | France        | 4        | ○  | ○  | ●  | ○  |    |    |    |    |
|                         | Spain         | 5        | ●  | ○  | ●  | ○  |    |    |    |    |
|                         | Italy         | 6        | ○  | ●  | ●  | ○  |    |    |    |    |
|                         | Sweden        | 7        | ●  | ●  | ●  | ○  |    |    |    |    |
|                         | Denmark       | 8        | ○  | ○  | ○  | ●  |    |    |    |    |
|                         | Norway        | 9        | ●  | ○  | ○  | ●  |    |    |    |    |
|                         | Portugal      | 10       | ○  | ●  | ○  | ●  |    |    |    |    |
|                         | Switzerland   | 11       | ●  | ●  | ○  | ●  |    |    |    |    |
|                         | USA           |          |    |    |    |    |    |    |    |    |
|                         | Finland       |          |    |    |    |    |    |    |    |    |
| ASSH - Hopper           |               |          |    |    |    |    | ●  |    |    |    |
| ASSH - A4L/3BIN- Manual |               |          |    |    |    |    | ○  |    |    |    |
| Left Margin 8           |               |          |    |    |    |    |    | ●  |    |    |
| Left Margin 1           |               |          |    |    |    |    |    | ○  |    |    |
| High Speed              |               |          |    |    |    |    |    |    | ●  |    |
| Normal Speed            |               |          |    |    |    |    |    |    | ○  |    |
| Dump Mode *             |               |          |    |    |    |    |    |    |    | ●  |
| Normal                  |               |          |    |    |    |    |    |    |    | ○  |

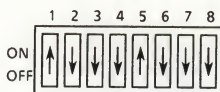
SW1-4 not effective for teletex or IBM character generator.

On •  
Off 0

\* Only effective after switching OFF/ON.

## Interface Parameter 1 DIP Switch block 2

Default setting for P9000 m-system



| PARAMETERS                             |       | SWITCHES |    |    |    |    |    |    |    |
|----------------------------------------|-------|----------|----|----|----|----|----|----|----|
|                                        |       | #1       | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| X-ON/X-OFF Protocol ** Full Duplex     |       | •        |    |    |    |    |    |    |    |
| READY/BUSY DTR Protocol ** Half Duplex |       | o        |    |    |    |    |    |    |    |
| Autostatus Report                      | NO    |          | •  |    |    |    |    |    |    |
|                                        | YES   |          | o  |    |    |    |    |    |    |
| Parity *                               | Odd   |          |    | •  |    |    |    |    |    |
|                                        | Even  |          |    | o  |    |    |    |    |    |
| Data Bits                              | 7     |          |    |    | •  |    |    |    |    |
|                                        | 8     |          |    |    | o  |    |    |    |    |
| Parity Check                           | NO *  |          |    |    |    | •  |    |    |    |
|                                        | YES   |          |    |    |    | o  |    |    |    |
| Baud Rate                              | 19200 |          |    |    |    |    | •  | •  | •  |
|                                        | 9600  |          |    |    |    |    | o  | o  | o  |
|                                        | 4800  |          |    |    |    |    | •  | o  | o  |
|                                        | 2400  |          |    |    |    |    | o  | •  | o  |
|                                        | 1200  |          |    |    |    |    | •  | •  | o  |
|                                        | 600   |          |    |    |    |    | o  | o  | •  |
|                                        | 300   |          |    |    |    |    | •  | o  | •  |

On •  
Off o

\* If switch 5 = ON

Switch 3 = ON means character with parity bit

Switch 3 = OFF means character without parity bit

\*\* Only in case of ACK/NAK protocol

## Interface Parameter 2 DIP Switch block3

Default setting for P9000 m-system



| PARAMETERS               | SWITCHES |    |    |    |    |    |    |    |
|--------------------------|----------|----|----|----|----|----|----|----|
|                          | #1       | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| 12" from size            | •        |    |    |    |    |    |    |    |
| 11" from size            | 0        |    |    |    |    |    |    |    |
| 1" skip over perforation |          | •  |    |    |    |    |    |    |
| No skip over perforation |          | 0  |    |    |    |    |    |    |
| Line space 8 lpi         |          |    | •  |    |    |    |    |    |
| Line space 6 lpi         |          |    | 0  |    |    |    |    |    |
| Font 1                   |          |    |    | •  |    |    |    |    |
| Font 2                   |          |    |    | 0  |    |    |    |    |
| Emulation ON *           |          |    |    |    | •  |    |    |    |
| ACK/NACK                 |          |    |    |    |    | 0  | •  |    |
| ENQ/ACK                  |          |    |    |    |    | •  | •  |    |
| X-ON/X-OFF               |          |    |    |    |    | 0  | 0  |    |
| 7 KByte Line Buffer *    |          |    |    |    |    |    |    | •  |
| 1 KByte Line Buffer      |          |    |    |    |    |    |    | 0  |

On • \* ON for 11" paper size.  
Off 0

## Option 1 Parameter DIP Switch block4

Default setting for P9000 m-system



| PARAMETERS               | SWITCHES |    |    |    |    |    |    |    |
|--------------------------|----------|----|----|----|----|----|----|----|
|                          | #1       | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| \$\$ conversion active   | •        |    |    |    |    |    |    |    |
| \$\$ conversion inactive | o        |    |    |    |    |    |    |    |
| Auto CR after LF ON      |          | •  |    |    |    |    |    |    |
| Auto CR after LF OFF     |          | o  |    |    |    |    |    |    |
| Auto LF after CR ON      |          |    | •  |    |    |    |    |    |
| Auto LF after CR OFF     |          |    | o  |    |    |    |    |    |
| Auto insert ON           |          |    |    | •  |    |    |    |    |
| Auto insert OFF          |          |    |    | o  |    |    |    |    |
| Not to be changed        |          |    |    |    | o  |    |    |    |
| Not to be changed        |          |    |    |    |    | o  |    |    |
| Tractor Feed Only        |          |    |    |    |    |    | •  |    |
| Cut Sheet / ASSH         |          |    |    |    |    |    | o  |    |
| Paper Run Check ON       |          |    |    |    |    |    |    | •  |
| Paper Run Check OFF      |          |    |    |    |    |    |    | o  |

On •  
Off o

**NOTE:** With both switches 2 and 3 ON, each line feed will be done twice.  
In case tractor feed is in use put switch 7 to "on"

## Option 2 Parameter DIP Switch block 5

Default setting for P9000 m-system



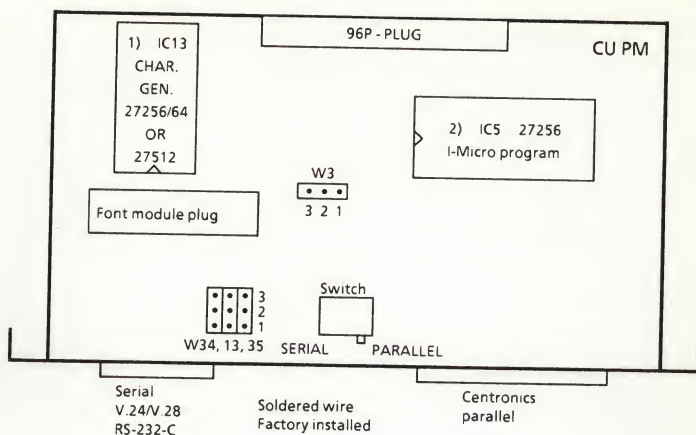
\* Factory setted  
Do Not Change

| PARAMETERS              |                | SWITCHES |    |    |    |    |    |    |    |
|-------------------------|----------------|----------|----|----|----|----|----|----|----|
|                         |                | #1       | #2 | #3 | #4 | #5 | #6 | #7 | #8 |
| Needle Correction       | (-)            | •        |    |    |    |    |    |    |    |
|                         | (+)            | o        |    |    |    |    |    |    |    |
| Needle Correction Value | 2 <sup>0</sup> |          | •  |    |    |    |    |    |    |
|                         |                |          | o  |    |    |    |    |    |    |
|                         | 2 <sup>1</sup> |          |    | •  |    |    |    |    |    |
|                         |                |          |    | o  |    |    |    |    |    |
|                         | 2 <sup>2</sup> |          |    |    | •  |    |    |    |    |
|                         |                |          |    |    | o  |    |    |    |    |
|                         |                |          |    |    |    | o  |    |    |    |
| NOT TO BE CHANGED       |                |          |    |    |    |    | o  |    |    |
| NOT TO BE CHANGED       |                |          |    |    |    |    |    | •  |    |
| NOT TO BE CHANGED       |                |          |    |    |    |    |    | o  |    |
| Copy Switch             | ENABLE         |          |    |    |    |    |    |    | •  |
|                         | DISABLE        |          |    |    |    |    |    |    | o  |

On •  
Off o



# Strap Settings Personality Module (SP2 PX NV-2.5) 8700-220-90192

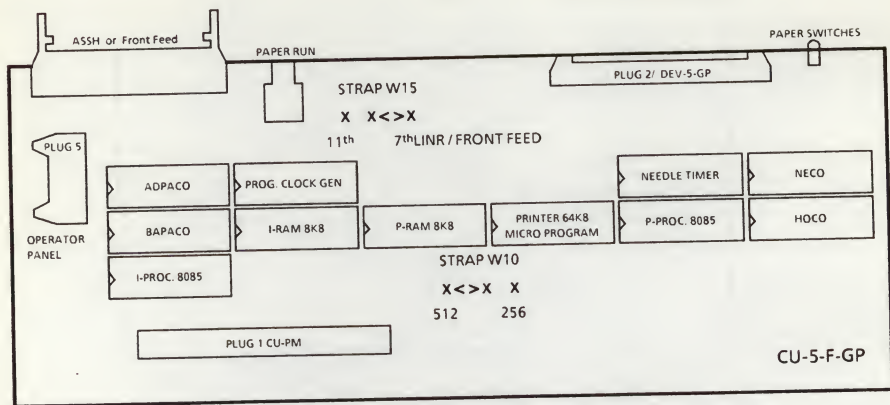


| STRAP  | POSITION                            | PURPOSE                                                                                                                   |
|--------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| W3     | 3 - 2<br>1 - 2                      | 1) Char. Gen. IC13 = 27256 or 2764<br>IC13 = 27512                                                                        |
| switch | parallel<br>serial                  | Enables centronics parallel input<br>Enables serial input + straps W13, W34, W35                                          |
| W13    | 3 - 2 *<br>1 - 2                    | <b>Synchr. Transm.</b> ; 113 = BRCLK<br>Synchr. Transm. ; 113 = 115 (optional)                                            |
| W34    | 1 - 2 *<br>3 - 2                    | <b>CD, no modem, CT109 not used</b><br>CD, modem, CT109 used (optional)                                                   |
| W35    | <b>no strap *</b><br>1 - 2<br>3 - 2 | <b>Asynchr. transm.</b><br><br>Synchr. * * 115 = Tx C = Rx C (optional)<br>Synchr. * * 114 = Tx C ; Rx C = 115 (optional) |

\* Factory setting (soldered wire)

\*\* Synchronous transmission is only possible after special modifications in the workshop!.

# Strap Setting CU - 5 - F - GP PCB



| CONTROL UNIT                                   |                 |                            |   |   |   |   |   |   |   |   | CS<br>NUMBER<br>5322 214 | STRAPS<br><br>(see above)                                     |  |
|------------------------------------------------|-----------------|----------------------------|---|---|---|---|---|---|---|---|--------------------------|---------------------------------------------------------------|--|
| NAME                                           | 12 NC NUMBER    |                            |   |   |   |   |   |   |   |   |                          |                                                               |  |
|                                                | 12 NC           | last 12th<br>digit / level |   |   |   |   |   |   |   |   |                          |                                                               |  |
|                                                |                 | 9                          | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |                          |                                                               |  |
| CU - 5 - F - GP **                             | 5112 292 1770   |                            |   |   |   |   | 4 | 3 | 2 | 1 | 40449                    |                                                               |  |
| CU - 5 - F GP without<br>ADPACO                | 5112 292 2880   |                            |   |   |   |   | 4 | 3 | 2 | 1 | -                        |                                                               |  |
| ADPACO eprom (A1 + M1)                         | 5112 292 0599   |                            |   |   |   |   | - | - | 1 | 1 |                          | W15 = . for 7th line *<br>Front Feed<br>W15 = . for 11th line |  |
| ADPACO rom (A1)                                | 5112 208 0569   |                            |   |   |   |   | - | - | 1 | 1 |                          |                                                               |  |
| ADPACO eprom (A1 + M1)                         | 5112 208 0569** |                            |   |   |   |   | - | ? | 2 |   |                          |                                                               |  |
| BAPACO rom                                     | 5112 208 0529   |                            |   |   |   |   | 2 | 2 | 2 | 2 |                          |                                                               |  |
| IC 18, 27512, Printer-<br>micro program P / 24 | 5112 208 0517   |                            |   |   |   |   | 4 | 3 | 2 | 1 |                          | W10 = . for 27512 *                                           |  |
| NECO, 8748, eprom                              | 5112 208 0550   |                            |   |   |   |   | - | - | 1 | 1 |                          |                                                               |  |
| NECO, 8048, rom                                | 5112 208 0582   |                            |   |   |   |   | 1 | 1 | - | 1 |                          |                                                               |  |
| HOCO, 8742, eprom                              | 5112 208 0516   |                            |   |   |   |   | - | - | 2 | 1 |                          |                                                               |  |
| HOCO, 8042, rom                                | 5112 208 0581   |                            |   |   |   |   | 1 | 1 | - | - |                          |                                                               |  |

\* = Factory setting

\*\* = Normally for Philips Data Systems

† = This level can not handle ROM version

A1 = Automatic Insert

M1 = Manual Insert ; sw 4 ON, OFF / OPT 1

## 20.5.4 Installation

See CE Manual Printers (GP 310FSM) for more detailed information.

### Step 1:

#### Remove housing and select protective ground:

If necessary the strap connection between the printer's LOGIC 0 line to Protective Earth can be changed. There are two possibilities, you must determine the earthing scheme of the system to which the customer wishes to connect the GP 310 and set the strap accordingly.

#### Selection 1 - Direct to Protective Earth

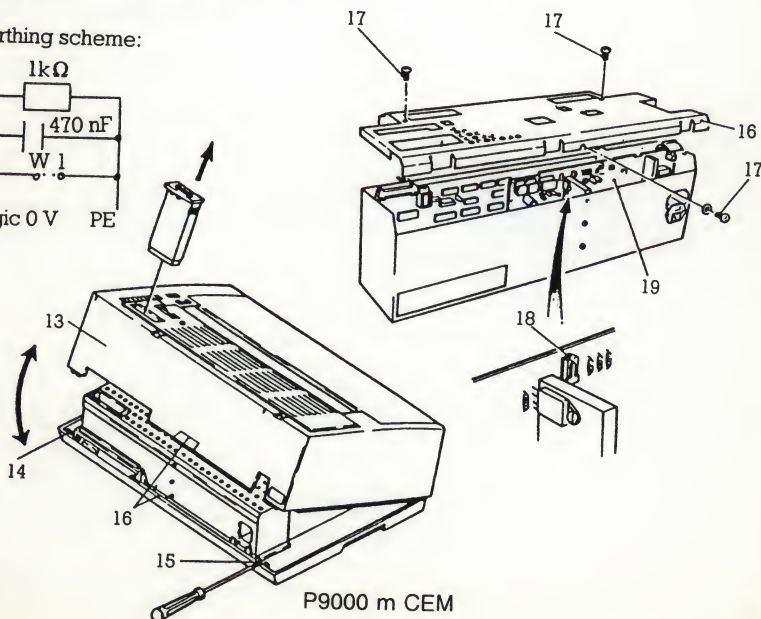
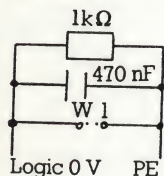
This is factory preset selection. LOGIC 0 and PE are connected direct shielding is provided by the printer.

#### Selection 2 - To Protective Earth via a $1k\Omega$ resistor || $470nF$

LOGIC 0 is connected to PE via a  $1k\Omega$  resistor - in parallel with a  $470\text{ nF}$  capacitor - strap position (18) removed.

1. Remove the top housing (13) by releasing the housing snap locks (14) and (15), these are located at the rear of the printer, with a flatbladed screwdriver.
2. Remove the electronics compartment cover (16) by undoing the three screws (17).
3. Locate the strap position (18) on the power supply PCB (19).  
Reposition or remove strap in accordance with the required earthing scheme.  
See selections above.
4. Reassemble the cover (16) and secure screws (17).
5. Refit the top housing (13).

Earthing scheme:

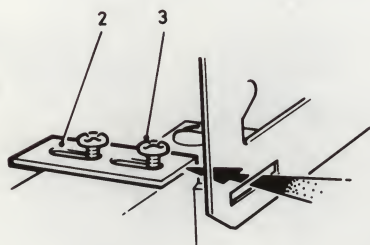
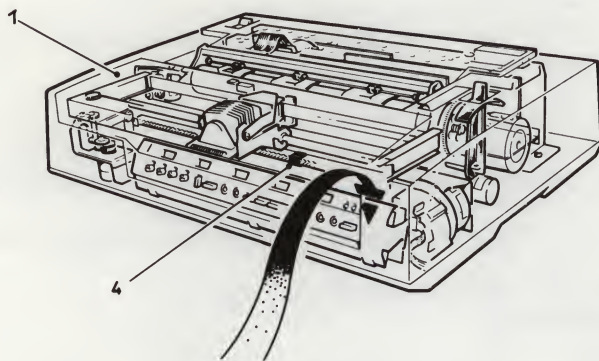


## Step 2:

### Remove transport locks:

**WARNING:** Do not connect the printer to the mains until you are directed to do so.

1. Slide the front cover (1) forward and lift it clear of the printer.
2. Release and remove the lock clamp (4) on the carriage drive belt and slide the printhead to the left.
3. Reposition the carriage safety lock (2) by loosening the two screws (3) and sliding the lock towards the left.
4. When in the new position retighten the two screws (3).
5. Slide the lock clamp (4) onto the left edge of the carriage safety lock (2) for safe keeping. The correct voltage will be visible now through the window.





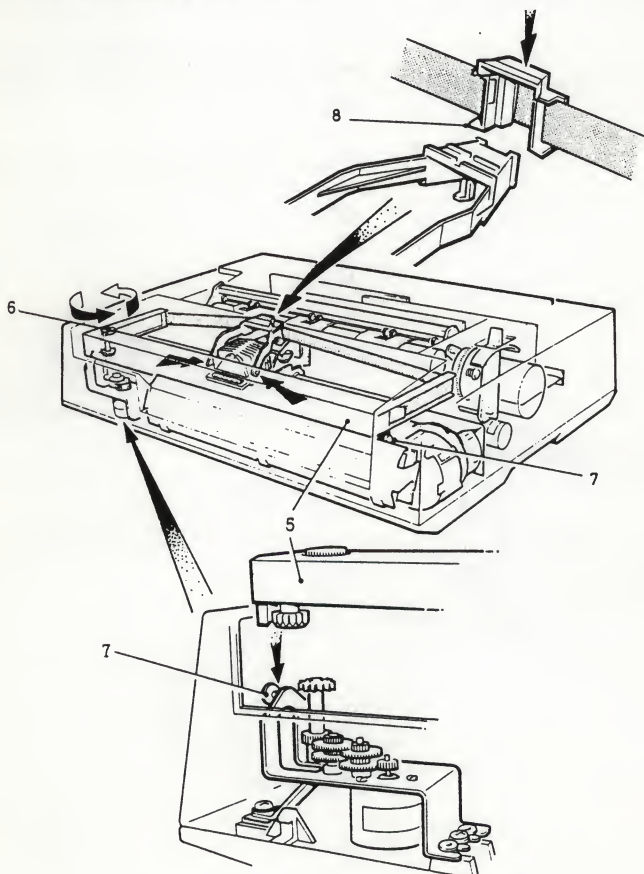
### Step 3:

#### Mount the ink ribbon cassette:

**CAUTION:** Ensure that only PHILIPS ink ribbon cassettes are used with GP 310/490 printers. Use of non-PHILIPS ink ribbons may damage the printhead.

The mounting procedure is the same for both black and 4-colour ink ribbon cassettes.

1. Take the ink ribbon cassette (5) and remove any excess ribbon slack by turning the adjuster (6) counter-clockwise.
2. Carefully lower the ink ribbon cassette (5) first onto the left mounting point (7) and then onto the right mounting point (7).
3. With the ink ribbon cassette in position, slide the ribbon guide feed (8) into the printhead guide.
4. Make sure that the ribbon is not folded between printhead and platen in the working position of the ribbon guide feed.





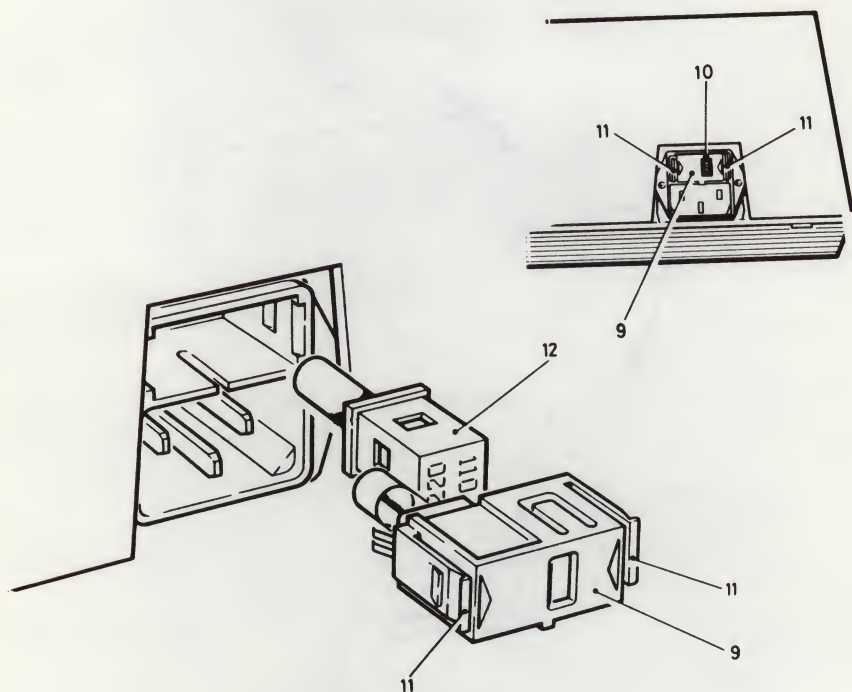
**Step 4:**

**Check the mains input voltage selection:**

**WARNING:** Do not connect the printer to the mains until you are directed to do so.

**CAUTION:** An incorrect voltage selection can seriously damage the printer.

1. Locate the mains input socket at the lower rear of the printer, immediately above the socket is the fuse and selector block module (9).
2. Check that the voltage selection as indicated on the block module slot (10), corresponds to the mains voltage rating.
  - 220V position is for 180 to 264VAC range (factory set)
  - 110V position is for 90 to 140VAC range.
3. If you need to change the selection withdraw the fuse and selector block module (9) by compressing the two side lugs (11) with your fingers.
4. Remove the selector contact (12) and rotate 180 deg. so that the required voltage rating appears in the block module slot (10).
5. Insert the fuse and selector block module (9) back into its recess by aligning the key and locating slot, and pushing inwards until the two side lugs (11) lock into position.



**Step 5:**

**Replace the housing:**

**Step 6:**

**Mount a personality module:**

To be able to connect the GP 310/490 to a host system, you must first install a Personality Module.

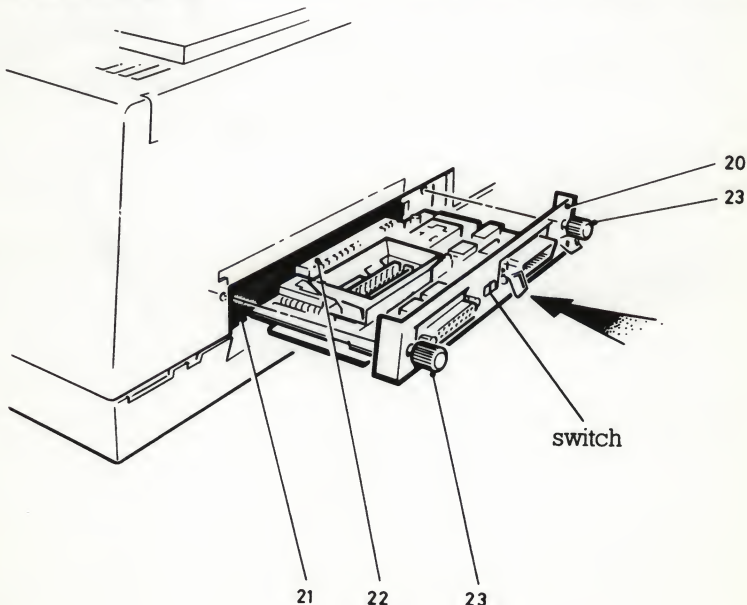
**CAUTION:** *To avoid damage arising from electrostatic discharge do not touch pins or components on the Personality Module.*

1. Remove the module (20) from its packing.
2. Locate the module slot at the lower rear of the printer (21).

**CAUTION:** *Never attempt to install or remove a Personality Module whilst a Font Module is mounted to the printer, or while the printer is powered on.*

3. Insert the module with the component side uppermost, until the 96 pin connector (22) fully engages. Hand tighten the two lockscrews (23), ensuring that they are correctly aligned.
4. When connecting a host to a Personality Module with more that one interface plug, slide the switch located between the two in the direction of the interface used.

**CAUTION:** *Ensure that when the printer is operating only one interface cable is plugged at the same time.*



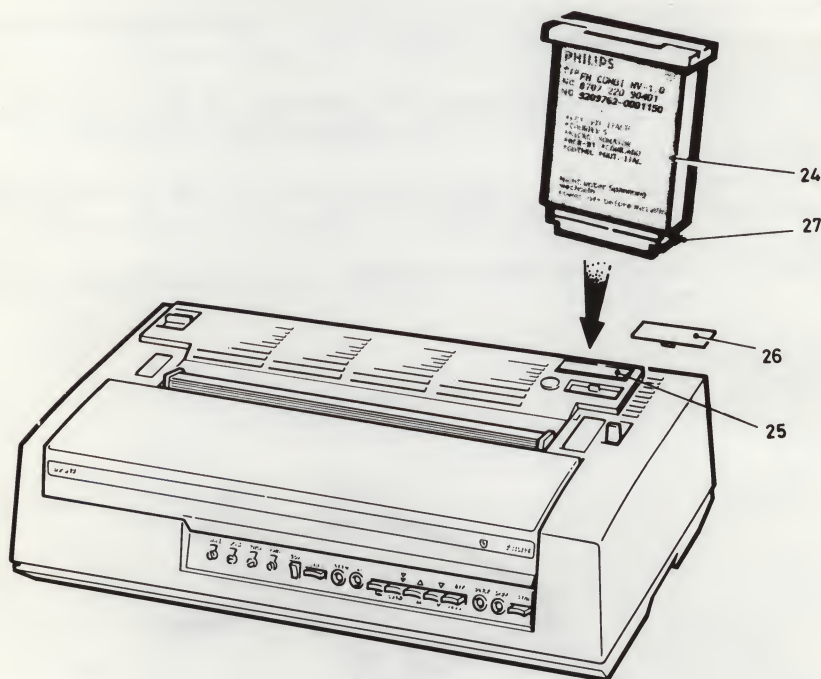
### Step 7:

#### Mount a font module:

1. Remove the Font Module (24) from its packing.
2. Locate the Font Module slot (25) at the top-right-rear of the printer and remove the insert cover (26).

**CAUTION:** Never attempt to install or remove a Font Module while the printer is powered on.

3. Insert the Font Module, with the annotation facing the front, until its connector (27) fully engages with the installed Personality Module.



## 20.5.5 Maintenance

### Off-Line Printer Test

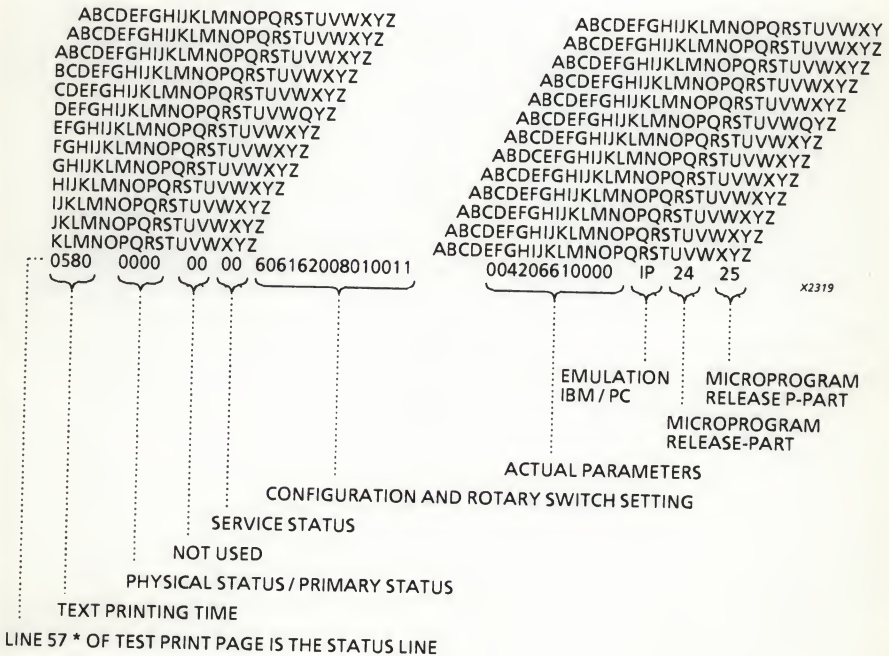
#### Starting/Stopping the Off-Line Test Platen Feed

- Switch PRINTER ON.
- Press the START/STOP button.
- Check that the START/STOP lamp is lit, if not press START/STOP button again.
- Press keys F and TEST together.
- Press START/STOP button, the printhead moves to the left and opens catch flaps of the INSERTER. ERROR and STOP lamp lit.
- Load paper into the paper support and press START/STOP button. The paper will be inserted and the OFF-LINE TEST starts printing.
- When F and TEST key are pressed simultaneously the OFF-LINE TEST will be switched off (STOPPED).

The print-out of the off-line test consists of 57\* is the status line.

#### Status Line Decoding

The Status Line is printed at the end of each page which is printed in the off line test mode.



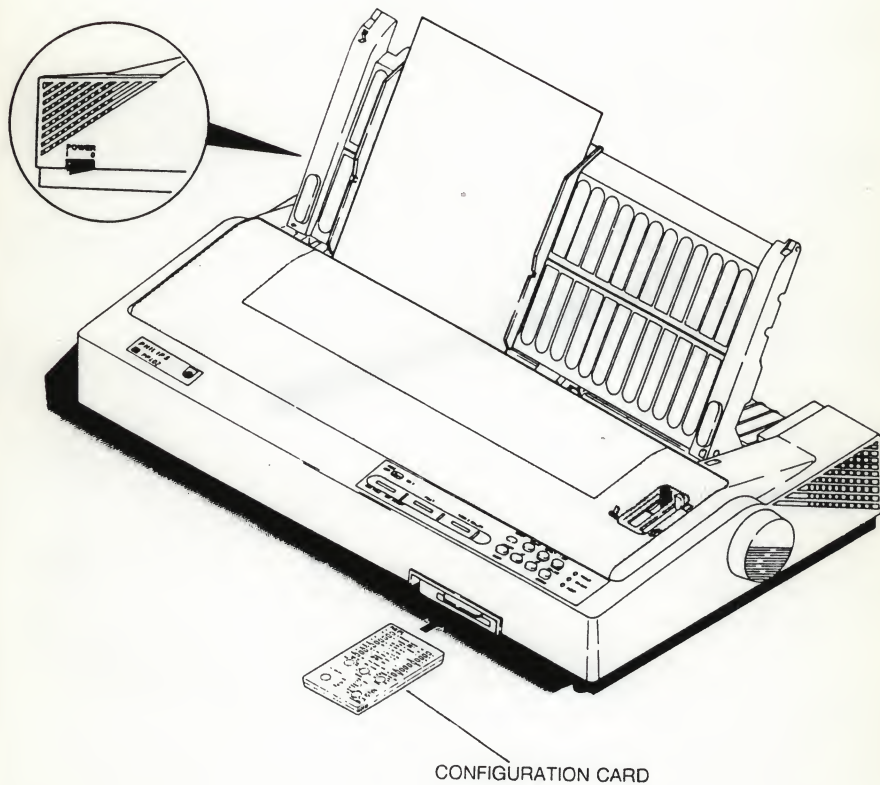




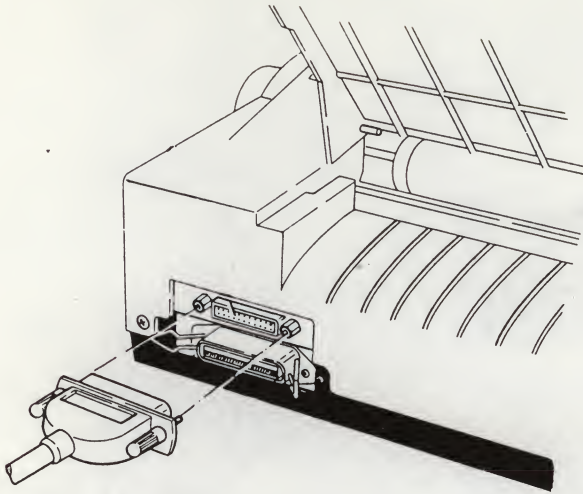


**20.6 P2942 (PP402)**

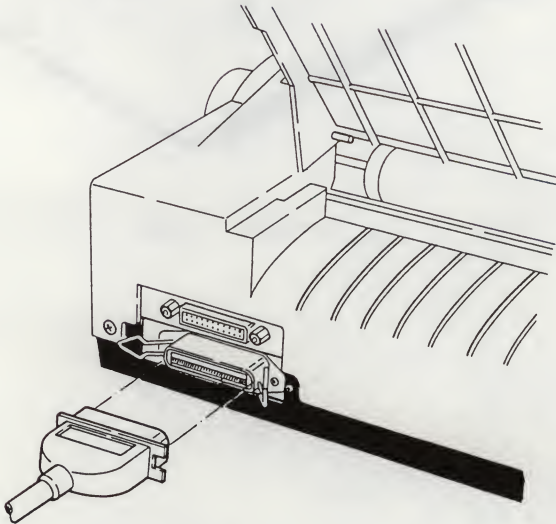
### 20.6.2 Connections



## Serial Interface



## Parallel Interface





### 20.6.3 Strap Settings

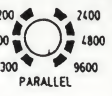
All options can be set on the Configuration Card. (See 20.8.1).


■ PP402 . . .
PHILIPS

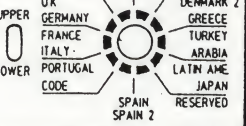
|                                     |                 |                    |                                      |
|-------------------------------------|-----------------|--------------------|--------------------------------------|
| OFF <input type="checkbox"/> ON     | ITALIC (A MODE) | 1" PERF SKIP       | OFF <input type="checkbox"/> ON      |
| OFF <input type="checkbox"/> ON     | AGM II MODE)    | BOLD               | OFF <input type="checkbox"/> ON      |
| 0 <input type="checkbox"/> 9        | ZERO STYLE      | IMMEDIATE PRINTING | NO <input type="checkbox"/> YES      |
| 1/6" <input type="checkbox"/> 1/8"  | LINE SPACE      | ASF INSTALLED      | 1 <input type="checkbox"/> 1.2       |
| CR <input type="checkbox"/> CR + LF | CR FUNC         | ASF BIN            | LARGE <input type="checkbox"/> SMALL |
| CR + LF <input type="checkbox"/> LF | LF FUNC         | DATA BITS          | 8 <input type="checkbox"/> 7         |
| CR + LF <input type="checkbox"/> CR | WRAP AROUND     | STOP BIT           | 1 <input type="checkbox"/> 2         |
| ON <input type="checkbox"/> OFF     | PAPER SENSE     | PARITY             | OFF <input type="checkbox"/> ON      |
| UNI <input type="checkbox"/> BI     | GRAPHICS        | PARITY             | EVEN <input type="checkbox"/> ODD    |
| A <input type="checkbox"/> MODE     | PRINT DIRECTION | PARITY ERROR       | DEL <input type="checkbox"/> . .     |
|                                     | EMULATION       |                    |                                      |

**CHARA SET**  
 SET 1 SET 2  


**SERIAL PROTOCOL**  


**PARALLEL/SERIAL (BPS)**  


**TOP ADJUSTMENT**  


**NATIONAL VERSION**  


- NOTE:**
- \* Always turn power OFF before removing or inserting Configuration Card.
  - \* Some of the switch settings can be overruled by software commands.
  - \* Switch settings become valid after Power On or Reset.

To connect the printer to the system, first configure the communications part:

### Parallel Interface

- switch the print and the computer OFF.
- connect the interface cable coming from the computer to the printer's parallel plug.
- set the PARALLEL/SERIAL switch on the Configuration Card to the PARALLEL position.
- unless there are special requirements by your computer, set the switch BUFFER to LARGE.

Buffer sizes are:

Small: 256 Bytes

Large: 5kBytes

- Opt. RAM board installed:

Large (I-mode): 36 kBytes

Large (A-mode): 65 kBytes

### Serial Interface

- switch the printer and the computer OFF.
- connect the interface cable coming from the computer to the printer's serial plug.
- unless there are special requirements by your computer, set the switch BUFFER to LARGE.

- Set the switches

|                     |      |     |
|---------------------|------|-----|
| Number of DATA BITS | 8    | 7   |
| Number of STOP BITS | 1    | 2   |
| PARITY CHECK        | OFF  | ON  |
| PARITY              | EVEN | ODD |
| PARITY ERROR        | DEL. | *** |

according to your computer. Check computer manual if in doubt. The last switch (PARITY ERROR) determines, whether data containing a parity error is to be ignored (DEL.) or printed as an asterisk ("\*\*").

- set the PROTOCOL switch to the type protocol used by your computer:

ETX/ACK

X-ON/X-OFF1

X-ON/X-OFF2

DTR

the difference between X-ON/X-OFF1 and 2 being that in case of X-ON/X-OFF2 the printer does not send X-ON immediately after Power On.

- set the PARALLEL/SERIAL switch on the Configuration Card to the number of Bits Per Second (BPS) transmitted by your computer.



1. **Italic (A Mode) / AFM (I Mode)**

The signification of this switch depends on whether the printer is set to A-Mode or to I-Mode (see switch 10).

In the A-Mode, when this switch is set to the ON position, all characters are printed in italics until the function is switched off via software.

In the I-Mode the switch is used to select (ON position) or deselect (OFF position) the Alternate Graphics Mode (AGM).

The selection of AGM results in different parameter values for some line spacing commands and allows for the use of an additional command to designate the graphics mode.

2. **Bold**

When this switch is set to the ON position, all characters are printed in bold until the function is switched off via software.

3. **Zero Style**

This switch determines the style of the number zero:

0 for text applications

Ø for data applications to distinguish the number from the letter O.

4. **Line Space**

This switch sets the distance between two lines to either 1/6" (line spacing 6 lpi (lines per inch)) or 1/8" (line spacing 8 lip).

5. **Carriage Return Function\***

CR is the standard position of this switch in the CR + LF position the printer adds a Line Feed command to every Carriage Return that is received via the interface.

6. **Line Feed Function**

In the CR + LF position of the switch, every Line Feed received via the interface automatically causes a Carriage Return. If this function is not wanted, set the switch to LF.

7. **Wrap Around\***

If a print line exceeds the right margin, the exceeding part is automatically "wrapped around" and printed from the left margin.

This switch specifies, in the above mentioned case, whether the present line is printed over (CR), or whether a Line Feed is automatically to be inserted by the printer (CR + LF).

\*) When using the parallel interface, and A-Mode is selected (switch 10), this function is always CR + LF, regardless of switch setting.



## 8. Paper Sense

For all normal applications this switch should remain in the ON position.

The switch is only valid for fanfold paper. If it is set to the OFF position the printer no longer expect its Paper In switch to be activated. It is thus possible to adjust the left tractor beyond the position defined as rightmost position in section "Inserting Fanfold Paper".

Paper insertion using the paper bail lever can then only be performed in the printer's Off-line state.

**IMPORTANT:** *With this switch in the OFF position, all printing should be kept under constant surveillance, as the printer no longer stops when paper is out.*

## 9. Graphics Print Direction

In the position BI all printing is done bidirectionally. If the switch is set to UNI, the printer switches to unidirectional printing as soon as graphics or graphic characters are received.

## 10. Emulation

To be able to use available printer drivers for most command software packages one of two printer emulations can be selected.

A Mode: ESC/P emulation (EPSON LQ-1050 equivalent) is activated.

I Mode: IBM Proprinter XL 24 emulation is activated.

The position of this switch also has an effect on the signification of switch 1.

## 11. 1" Perforation Skip

In the ON position of this switch, the printer inserts a Form Feed command 1 Inch before the end of the page. The function works for both single sheet and fanfold paper.

## 12. Immediate Printing

Normally the printer waits for a line to be finished (signalled by a Line Feed, Form Feed, or Carriage Return command) before starting to print it.

With this switch in the ON position, all data is printed as soon as there is no further input for at least 0.5 seconds.

## 13. ASF Installed

This specifies whether the optional Automatic Sheet Feeder is installed.

## 14. ASF Bin

With switch 13 in the YES position, this switch specifies whether the ASF alone (1 Bin) or the ASF with the extension module (2 Bin) are installed.

## 15. Select Character Set

The valid character set is selected according to this switch setting in combination with the switch setting NATIONAL VERSION and the emulation mode (A Mode / I Mode).

### ITALIC:

A Mode: Italic character set with ASCII characters in the code range from 20<sub>H</sub> to 7E<sub>H</sub> and the same characters repeated in italics in the range from A0<sub>H</sub> to FE<sub>H</sub>, incl. National Version characters.

I Mode: same as Set 1

**SET 1:** IBM Character Set 1 incl. National Version characters Exception: Special character sets (equal to CODE PAGE setting) are obtained if the NATIONAL VERSION switch is set to one of the following:

ARABIA

GREECE

PORTUGAL

**SET 2:** IBM Character Set 2, same as Set 1, only with printable characters in the code ranges from 03<sub>H</sub> to 06<sub>H</sub> and 80<sub>H</sub> to 9F<sub>H</sub>.

**CODE PAGE:** One of seven code tables, depending on the NATIONAL VERSION selection, e.g. Multilingual Character Set in switch setting Germany.

## 16. Top Of Form (TOF) Adjustment

Switch setting 0 defines the top vertical position that a sheet of paper can be inserted to (line 2), positions 1 to 9 cause the paper to be inserted from 1/12" to 9/12" further down.

## 17. National Version A-Mode: ESC R n

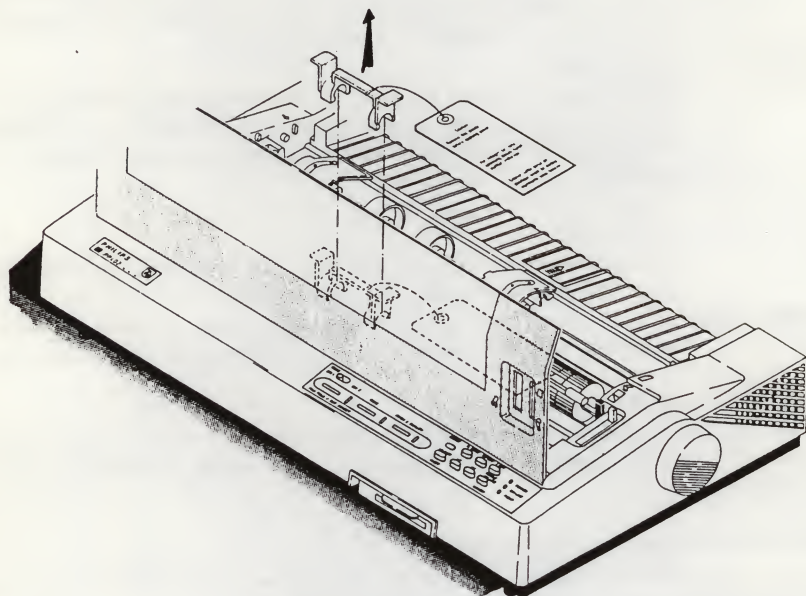
A total of 17 different national versions can be selected. This selection has a direct influence on the valid character set, see also switch 15.

The switch marked UPPER/LOWER selects one of the two versions that the rotary switch points at.

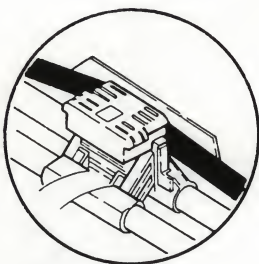
To be able to select the national version via software, the switch must be set to CODE. The default national version is then U.S.A.

## 20.6.4 Installation

1. Remove transport locks of printhead.



2. Install ink ribbon
  1. Set the power switch to the OFF position.
  2. Remove the printer cover.
  3. Ensure that the paper bail lever is in its rear position
  4. Move the printhead to a center position.
  5. Take your new ink ribbon cassette and remove any excess slack by turning the adjuster counterclockwise.
  6. Install the ink ribbon cassette so that the ribbon comes to rest between the printhead and the mask.
  7. Press down on the cassette at both ends to push it in its proper position.
  8. Move the printhead back and forth to settle the ribbon in the correct position.
  9. Replace the printer cover.

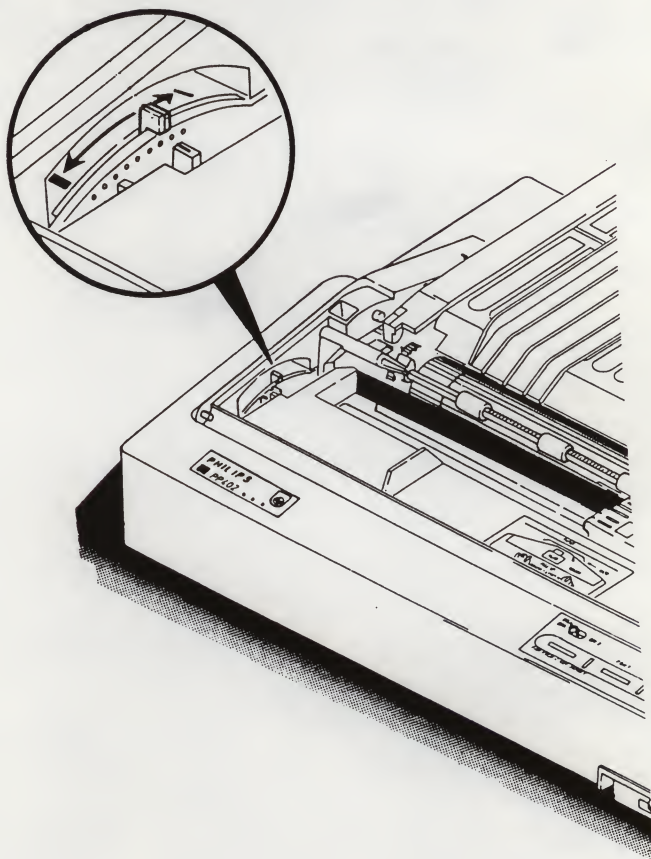




3. Insert Configuration Card (see 20.8.1).

4. Adjust Printhead to platen gap.

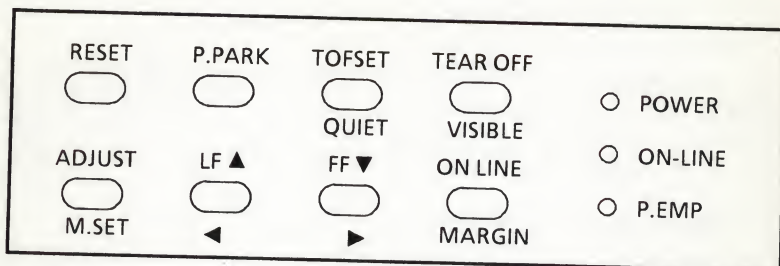
To achieve good print quality it is necessary that the printhead be in a certain distance from the paper. To adapt to a different paper thickness, the printhead can be moved toward (for thinner paper) or away from (for thick paper or form sets) the platen with the lever. The lever is factory set to the position shown in the figure.





5. Connect Printer to the mains

The operator panel looks like:



X4958

### Indicator Lamps

1. POWER (green)  
This lamp remains on while power is ON.
2. ON-LINE (green)
  - is lit:  
the printer is ON-LINE
  - blinks at 0.3 second intervals:  
the printer is in Set Margin mode
  - blinks alternately with P.EMP:  
the printhead thermal control is activated, printing is delayed to prevent the printhead from overheating.
3. P.EMPTY (red)
  - is lit:  
printer is out of paper
  - lights for 1 second:  
a sheet feeder error has been detected
  - blinks alternately with ON-LINE:  
printhead thermal control is activated

## **Operator Panel Keys**

The functions of the operator panel keys can be divided in those working while the printer in ON-LINE and those working while the printer is OFF-LINE. The RESET keys, finally, works in both states. The following description is structured accordingly.

### **RESET**

Pressing and releasing this switch has the same effect as switching the printer OFF and ON again, i.e. all the settings of the Configuration Card and the operator panel switches are read and become valid, the internal communication buffer is cleared and the printer is set to ON-LINE. Margins as well as all previous software settings are cleared.

The key operates in both states of the printer (ON-LINE/OFF-LINE).

### **Keys effective in the ON-LINE state (ON-LINE LED is lit)**

#### **QUITE**

This key toggles between standard and quiet printing. It can be activated during the printing process. In quiet printing, each line is printed in two passes with fewer needles activated in each pass. This of course results in a low print speed.

#### **VISIBLE**

When this key is pressed the paper advances to a position where the last printed lines are visible, and remains there as long as the key is held. The function should only be used in connection with fanfold paper.

### **ON-LINE (press shortly) / MARGIN (press for at least 1 second)**

#### **ON-LINE**

The key toggles between ON-LINE and OFF-LINE. When the printer goes ON-LINE, changes in the rotary switch settings becomes effective.

#### **MARGIN**

Pressing this key for at least one second causes the printer to enter the margin setting mode. The ON-LINE lamp starts blinking and the printhead moves to what is up to that time the left margin. The printhead can now be moved using the < and > keys.

Pressing the M.SET key defines the present printhead position as the new left margin, the buzzer sounds once upon acceptance. The printhead now moves to its right margin. To leave the right margin unchanged, press the MARGIN switch to return to the printer ON-LINE state. To change it again move the printhead to the desired position and confirm the position by pressing M.SET. The printer then sounds the buzzer and automatically returns to the ON-LINE state.

If the buzzer sounds off several times, this indicates that the margin position has not been accepted (e.g. if the left margin is further right than the dedicated right margin); in this case press MARGIN and restart the procedure.

**Keys effective in the OFF-LINE state (ON-LINE LED is not lit)**

#### **P.PARK**

With fanfold paper inserted in the printer the action of this switch moves the paper to its park position.

#### **TOFSET**

Pressing this switch defines the present vertical position as Top Of Form (TOF) position and thus overrules the TOF switch on the Configuration Card (switch 16).

#### **TEAR OFF**

Pressing this switch causes the perforation of fanfold paper to move to the edge of the printer cover, where the page(s) can be easily torn off.

After activation of this function the paper bail lever must be activated to move the paper back to Top Of Form position. Until then only the switches FF (Form Feed) and ADJUST +  $\wedge$  /  $\vee$  are effective. The switches ADJUST +  $\wedge$  /  $\vee$  can be used to correct the vertical position if perforation and cover edge do not exactly match. A correction of this kind will be considered when the TEAR OFF function is repeated.

- This function only works properly if the paper was automatically inserted and never moved by action of the knob (31). Also the rotary switch PAPER SIZE must be set correctly.

#### **ON-LINE**

The key toggles between ON-LINE and OFF-LINE. When the printer goes ON-LINE, changes in the rotary switches settings become effective.

#### **FF**

Form Feed. In the ASF (Automatic Sheet Feeder) mode, a sheet is inserted or, if a sheet is already in the printer, this sheet is ejected. In other single sheet applications (without ASF) the paper needs to be inserted using the paper bail lever, the FF key will then only eject the sheet.

In case of fanfold paper the paper moves to the next Top Of Form (TOF) position.

#### **LF**

Line Feed. The paper advances one line in the current line spacing. Holding the switch causes continuous paper movement.

#### **ADJUST**

When this switch is pressed at the same time as  $\wedge$  or  $\vee$ , the paper moves up or down in steps of 1/180".

## 20.6.5 Maintenance

### Off-line Tests

#### Test Print

Two types of test prints are available:

- Data quality test print
- Letter quality test print in the font selected on the operator panel.

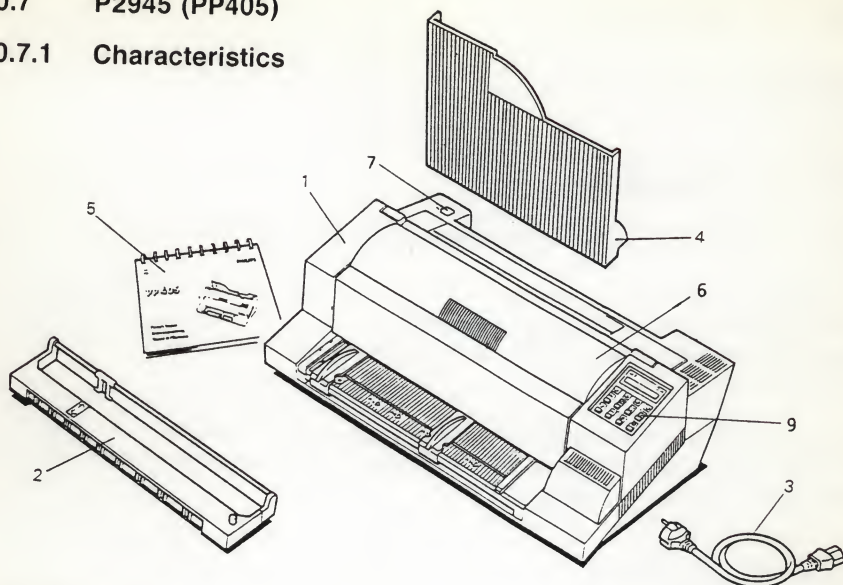
#### Start Test Print

- switch printer ON
  - insert paper
  - while holding down the RESET key, press the LF key (for data quality) or both LF and ON-LINE keys (for letter quality)
  - while holding the LF (and ON-LINE key(s), release the RESET key
  - keep holding LF (and ON-LINE) key(s) until printing commences.
- To start the test print with the printer powered OFF (paper must already be inserted), hold down the LF key (for data quality) or both LF and ON-LINE keys (for letter quality) while switching power ON. Hold the key(s) until printing commences. When repeating this procedure, be sure to wait at least 2 seconds after switching power Off before switching it back ON again.
- Stop the test print by pressing the ON-LINE key for at least one second or by pressing the RESET key.

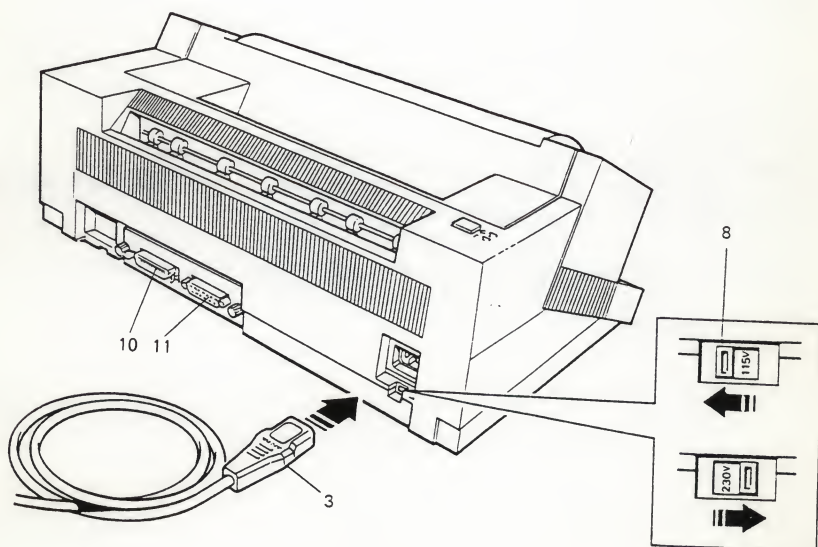


## 20.7 P2945 (PP405)

### 20.7.1 Characteristics



- 1. Printer P2945
- 2. Ribbon cassette
- 3. Mains cable
- 4. Output stacker
- 5. Owner's manual
- 6. Top cover
- 7. Power On/Off switch
- 8. Mains voltage selector
- 9. Operator panel
- 10. Interface plug (Centronics)
- 11. Interface plug (Serial)





## **20.7.2 Connections**

See the figure in section 20.7.1. The selection of the interface type is done via the operator's panel. See also section 20.7.4.

## **20.7.3 Strap setting**

For selecting the correct mains input voltage see the figure in section 20.7.1.

All straps on the printed circuit boards inside the P2945 (PP405) are factory set. All other functions and parameters are set via the operator's panel, see section 20.7.4. These settings must comply with the data in the system's printer model and interface file.

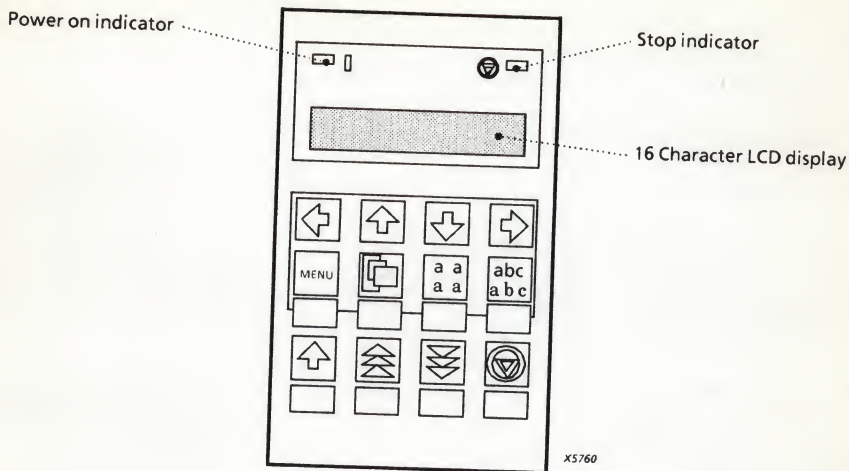
The P2945 (PP405) can emulate the Philips GP and the IBM Proprinter. When connecting to a P9000 m-system, you must select the right emulation mode and system model and interface file.

## **20.7.4 Installation**

For the installation rules, see the Owner's Manual. Each printer is delivered with an up to date Owner's Manual, use this manual, and keep it with the printer. In rough steps, the installation procedure consists of:

- Unpacking
- Remove the transport lock, a clip used to lock the printhead drive belt
- Install the Personality Module
- Select the correct mains input voltage
- Install the inkribbon cassette
- Install the Automatic Sheet Feeder(s) if present.
- Install the output stacker
- Install the paper
- Prepare the printer settings via the Operator's Panel, save them
- Switch on the printer and test it via its built-in tests. See the Owner's Manual or the Operator's Panel in this section
- Switch off the power to the printer and connect the interface cable to the system
- Switch on the printer and test the printer via the available system print commands.

## Operator's Panel



### 16-Character LCD display

Shows normally the current status of the printer. If an error occurs, the resulting error message overrides the displayed message.

### POWER ON (green)

Indicates that power is supplied to the printer.

### STOP (yellow)

Indicates that the printer is in the STOP mode. The printer enters the STOP mode when pushing the START/STOP key or when an error condition occurs.

### Function keys

The top row of keys (4) is used to enter the MENU mode where parameters concerning the interface, character attributes, margins, print modes, etc. are selected. For details on the use of these keys see the MENU FUNCTION in this section.

### EJECT Key

The EJECT key is used to eject the printed sheet/form from the print station.

### PAPER FEED Key

The PAPER FEED key is used to move the paper 1/90 inch (0.28mm) in the direction of the arrows (forwards). Holding down the key gives a continuous paper feeding.

### REVERSE PAPER FEED Key

The REVERSE PAPER FEED key is used to move the paper 1/90 inch (0.28mm) in the direction of the arrows (reverse). Holding down the keys gives a continuous paper feeding.

### **START/STOP Key**

The START/STOP key alternates between START mode and STOP mode. Pressing STOP:

- Turns on the STOP indicator
- Stops all printing and paper handling operations
- Causes the interface to change to LOCAL
- Enables all other function keys.

Pressing START:

- Switches off the STOP indicator
- Makes the printer ready for operation
- Either starts the printout or self-test functions when selected (via the MENU mode), or causes the interface status to change to ONLINE READY
- Exits from the MENU mode.

### **MENU FUNCTION**

The P2945 is not equipped with a number of dip switches for selecting the operator-selectable features. The selection of these features is done via the MENU.

The MENU is structured in three levels:

- Main Function, this is the highest level
- Item
- Value of the item, this is the lowest level.

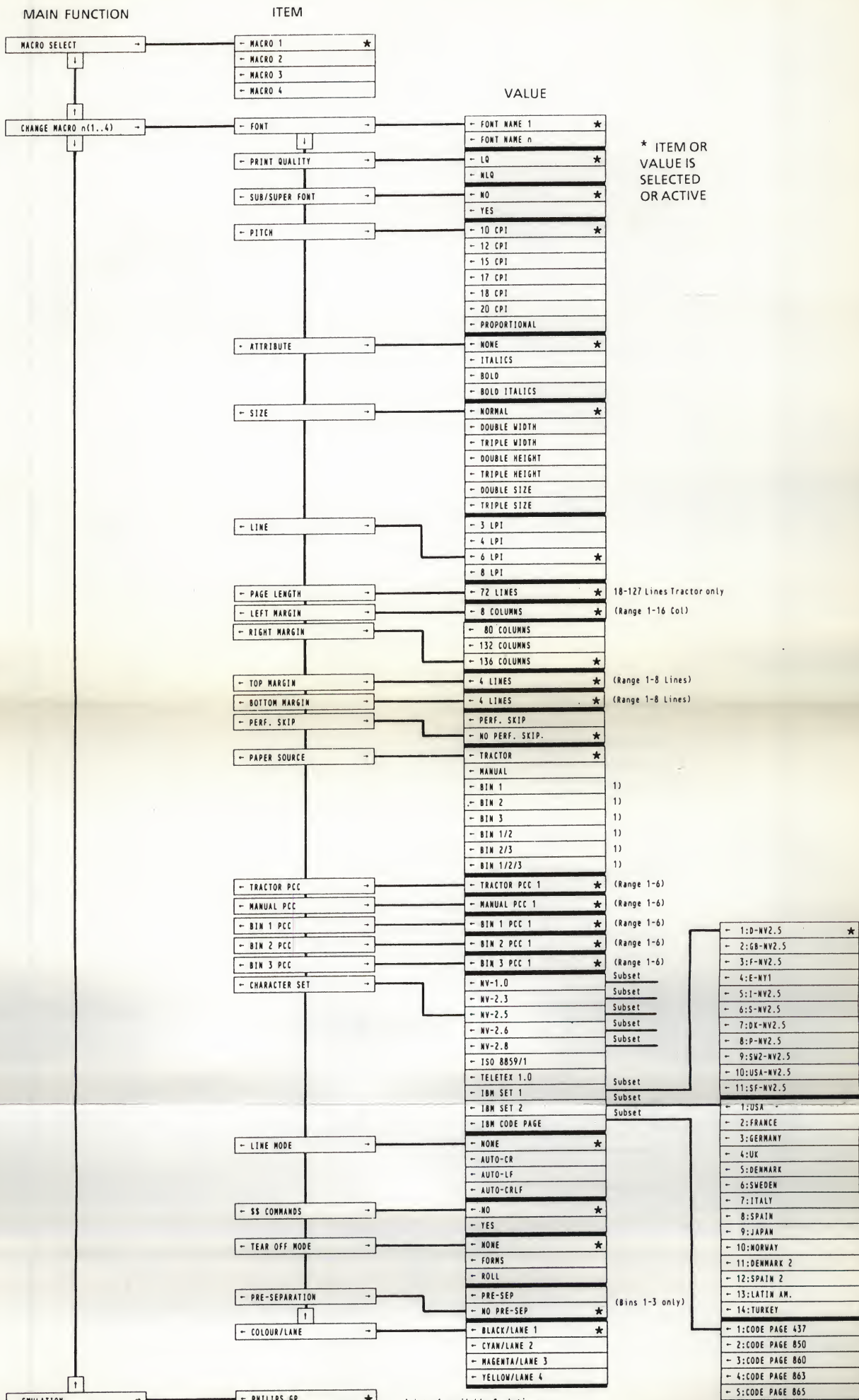
A number of Value settings are summarized into a 'Macro'. There are four Macros available, each with a different summary of Value settings.

Via the MENU mode the Macro can be modified and a Macro can be made active.

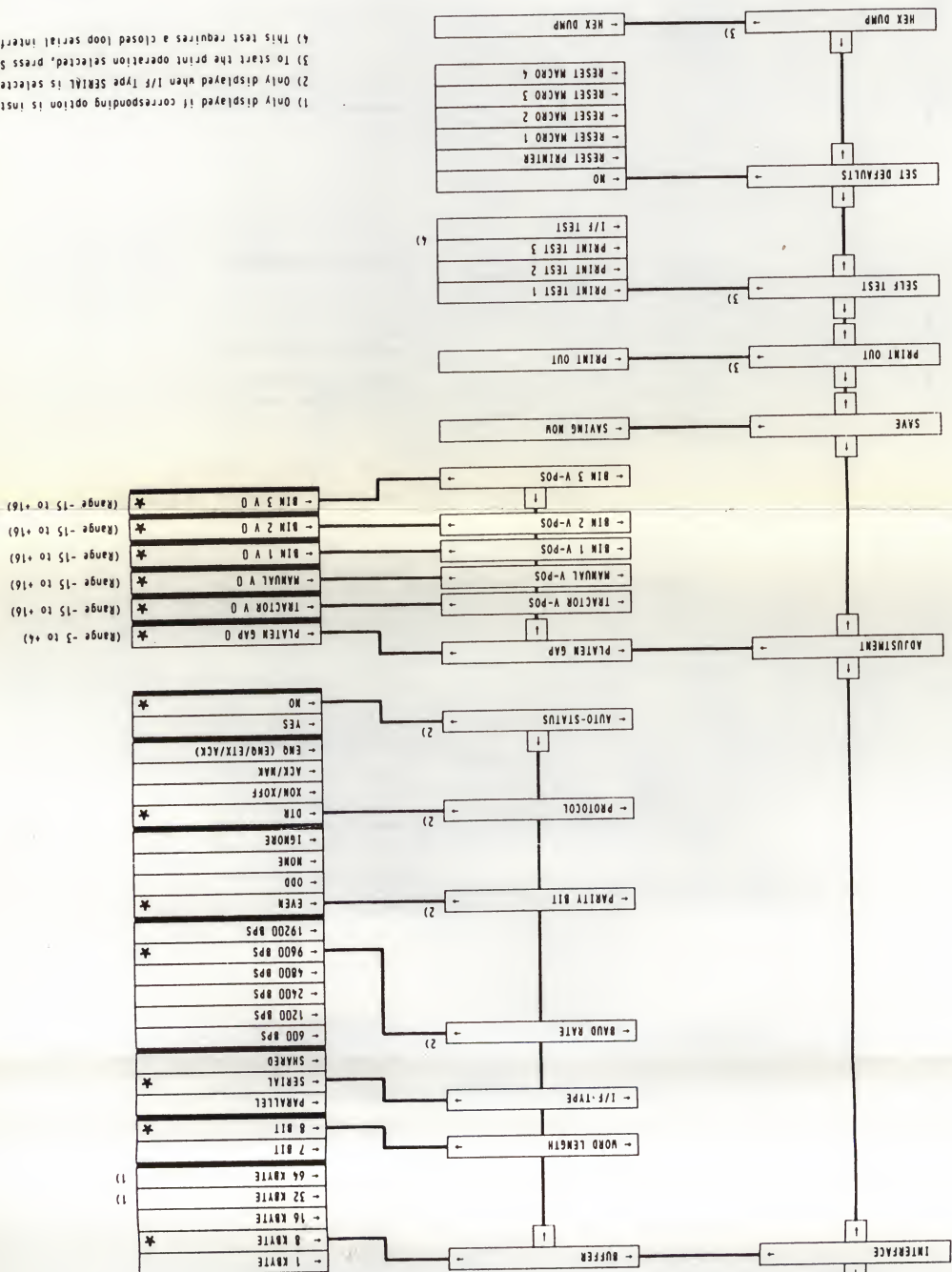
The MENU mode is entered by pushing MENU when in STOP mode.

See the following figure for the structure of the MENU mode.





TO OR FROM  
PREVIOUS PAGE





### **STATUS and ERROR messages**

The following messages are displayed if a condition exists which prevents normal operation of the printer.

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LOCAL</b>                           | Entered when START/STOP key was pressed. STOP indicator is lit as well.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>COVER OPEN</b>                      | Displayed when the top cover is open and the printer is in READY or BUSY mode.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>LOAD BIN ...</b>                    | Displayed whenever a form feed command or a print command is given by the host to a selected ASF cassette which is empty.                                                                                                                                                                                                                                                                                                                                                       |
| <b>LOAD TRACTOR</b>                    | Displayed whenever a form feed command is given by the host, the tractor is the selected paper source and there is no fanfold paper.<br>The printer enters the STOP mode.                                                                                                                                                                                                                                                                                                       |
| <b>LOAD MANUAL</b>                     | As per LOAD TRACTOR, except that the printer does not enter the STOP mode. Paper should be fed manually. The printer will accept paper and commence printing                                                                                                                                                                                                                                                                                                                    |
| <b>PAPER JAM TRF<br/>PAPER JAM ASF</b> | Displayed if eject forms fails in ASF. For tractor feed if successive line feeds fail to move fanfold paper correctly.                                                                                                                                                                                                                                                                                                                                                          |
| <b>TEAR OFF PAPER</b>                  | Displayed if current paper source is TRACTOR but different is then selected. Operator must 'tear off' the fanfold paper along the back edge of the printer (paper should be torn off from the left to the right). Press the START key to enable the fanfold paper to be fed backwards to a park position, and the newly selected paper source to be used.<br>Failure to tear off paper will cause the printer to enter the STOP mode and to continue to display TEAR OFF PAPER. |

## **20.7.5 Maintenance**

Preventive maintenance can be executed by the user, and should be done every six months or 50,000 prints, whichever occurs first.

The preventive maintenance consists of:

- Remove the top cover
- Thoroughly brush and vacuum all accessible areas to remove paper flock and dust
- Clean the platen's surface, the paper pressure rollers using the platen cleaner (Philips Platen Cleaner C/CP09 8709 004 10931)
- Clean the covers and the operator's panel with a damp, clean lint free cloth
- Remount the top cover

### **Testing the printer**

The printer can be tested via:

- MENU mode, see section 20.10.4 paragraph MENU FUNCTION
- Terminal and Printer Diagnostics (TPD) package under UNIX
- UNIX and UNIX application print commands and print utilities

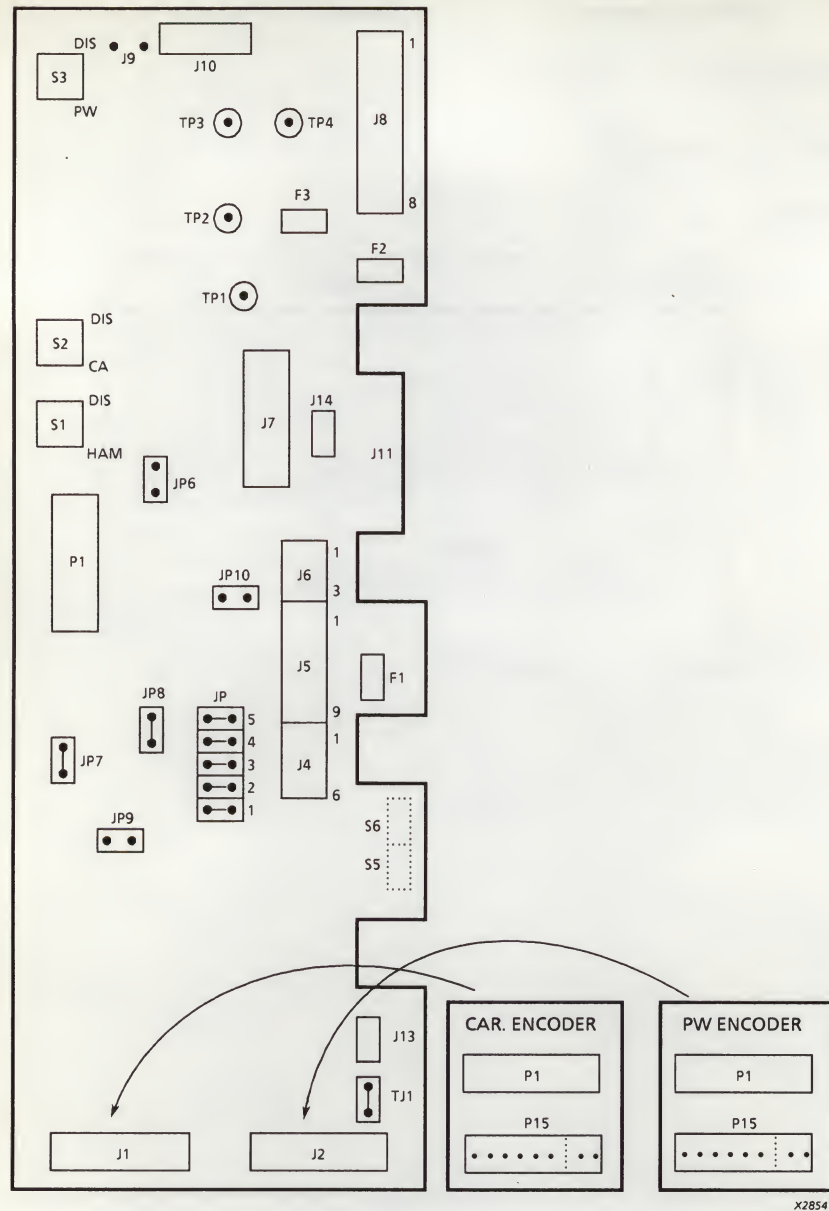
**20.8 P2950 (Qume S11 + /55)  
P2951 (Qume S11 + /Wide Track)**

The P2950 and P2951 are End Commercial Delivery.

**20.8.2 Connections**

Logic pcb

| CONNECTOR | REMARKS                                        |
|-----------|------------------------------------------------|
| J1        | Carriage decoder                               |
| J2        | Printwheel decoder                             |
| J4        | Paper out detection                            |
| J5        | Operator panel                                 |
| J6        | Carriage motor                                 |
| J7        | Power supply to J5                             |
| J8        | Printwheel/ribbon motor and hammer coil        |
| J9        | Hammer resistor                                |
| J10       | Paper feed motor                               |
| J11       | Test connector for power supply                |
| J13       | Not used (alt. out of paper)                   |
| J14       | Faston connection (ground)                     |
| P1        | Flat cable connection to from interface module |





### Power Supply PCB

| CONNECTOR | REMARKS            |
|-----------|--------------------|
| J1        | To main switch     |
| J2        | To fan             |
| J3        | Test connector     |
| J4        | Test connector     |
| J5        | To logic PCB to J7 |

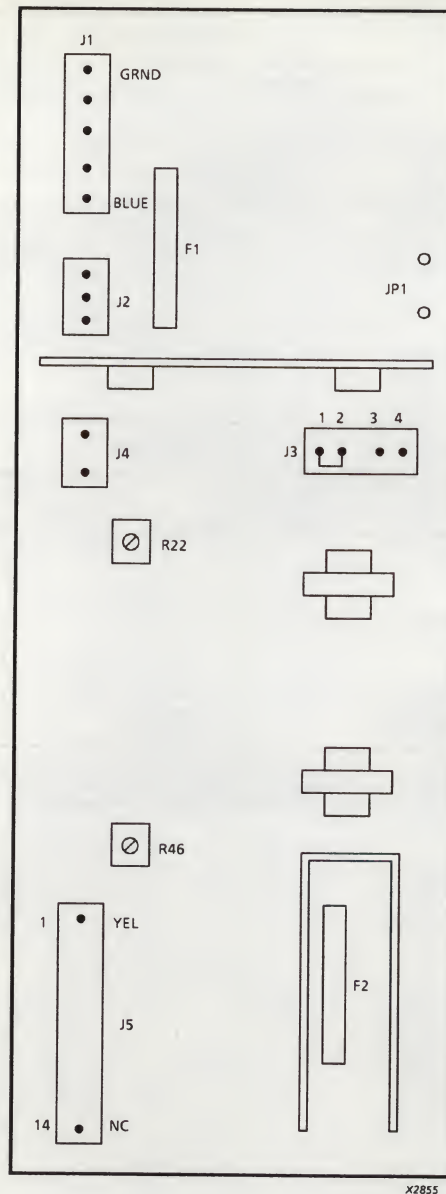
### Encoder PCB

#### Carriage Encoder PCB

| CONNECTOR | REMARKS                               |
|-----------|---------------------------------------|
| P1        | To logic PCB to J1                    |
| P15       | Carriage (bottom 2 pins are not used) |

#### Printwheel Encoder PCB

| CONNECTOR | REMARKS                                 |
|-----------|-----------------------------------------|
| P1        | To logic PCB to J2                      |
| P15       | Printwheel (bottom 2 pins are not used) |



### 20.8.3 Strap Settings

Strap and Switch setting

#### Logic PCB

Switch Setting

- S1 Hammer Enable/Disable Switch  
S2 Carriage Enable/Disable Switch  
S3 Printwheel Enable/Disable Switch  
S5,S6 Non of these switches can influence printer operation when the 13-bit parallel interface module is installed.

Default Strap Settings

| STRAP | STATE | REMARKS                 |
|-------|-------|-------------------------|
| JP1   | IN    |                         |
| JP2   | IN    |                         |
| JP3   | IN    |                         |
| JP4   | IN    | Self-test (GND          |
| JP5   | IN    |                         |
| JP6   | OUT   | Wide Track              |
| JP7   | IN    | Power-On Reset          |
| JP8   | IN    | Pause Enable            |
| JP9   | OUT   | Pause Disable           |
| JP10  | OUT   | Twintellect             |
| TJ1   | IN    | CLock Enable (Workshop) |

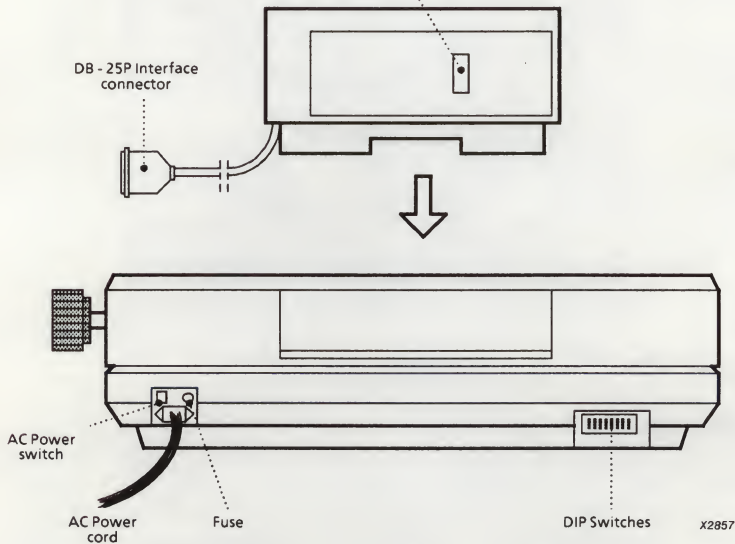
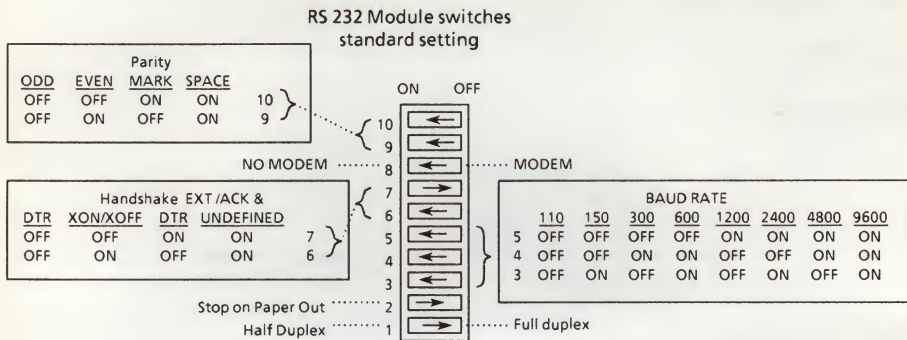
#### Power Supply PCB

Switch Setting: None

Strap setting

| STRAP | STATE     | REMARKS                   |
|-------|-----------|---------------------------|
| JP1   | IN<br>OUT | 93-132 VAC<br>190-264 VAC |

## Qume Connection Dip Switches





# Configuration Switches

Auto Line Feed

Line Pacing:

6 Lines/Inch

OFF

8 Lines/Inch

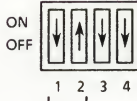
ON

Character Spacing

10 12 15 WPS

1 OFF OFF ON ON

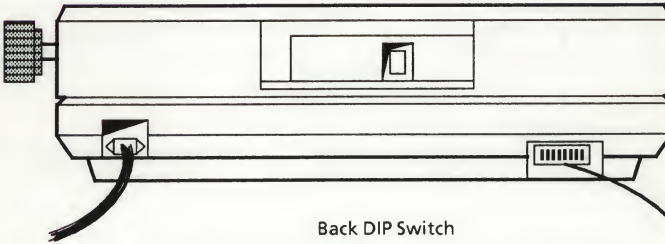
2 OFF ON OFF ON



X45/4

Form Length

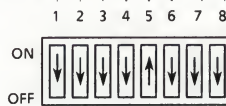
|   | 3   | 3½  | 4   | 5   | 5½  | 6   | 7   | 8   | 8½  | 9   | 10  | 11  | 11½ | 12  | 14  | 16 INCH |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------|
| 1 | OFF | OFF | OFF | ON  | OFF | OFF | OFF | OFF | OFF | ON  | ON  | ON  | ON  | ON  | ON  | ON      |
| 2 | OFF | OFF | OFF | ON  | OFF | ON  | ON  | ON  | ON  | ON  | ON  | OFF | OFF | OFF | OFF | ON      |
| 3 | OFF | OFF | ON  | OFF | ON  | OFF | OFF | ON  | ON  | OFF | ON  | OFF | OFF | ON  | ON  | ON      |
| 4 | OFF | ON  | OFF | OFF | ON  | OFF | ON  | OFF | ON  | ON  | OFF | OFF | ON  | OFF | ON  | ON      |



Back DIP Switch

Reserved Twintellect  
Twintellect German WP  
Reserved Twintellect

Auto BIDI Print  
Auto CRLF  
Not Used



X2856

Auto CRLF  
Auto BIDI Print

## 20.8.4 Installation

### Packing and Unpacking

- Unpacking instructions are provided with each printer. Follow them carefully.
- **CAUTION:** *Both the metal shipping strap on the bottom of the printer and the plastic carriage restraint installed on the carriage rail MUST be removed. These two unpacking straps are particularly important to avoid damage to the printer.*
- Save the Qume packaging carton and material (for shipping).
- The printer is normally shipped from the factory with the power supply configured for the AC voltage range specified by the customer. To change the AC input voltage range, a jumper and fuse on the power supply printed circuit board must be changed. (see power supply strap setting in this chapter).
- Remove the operator access cover and top cover assembly. Inspect the interior of the entire unit. Look for loose or broken parts, evidence of electrical damage, or other signs of damage.
- When the internal inspection is completed, install inkribbon cartridge, replace operator cover and top cover.

### Fuses

#### Logic Board

| FUSE | REMARKS                  |
|------|--------------------------|
| F1   | 5A, Carriage Drive Motor |
| F2   | 3A, Printwheel Motor     |
| F3   | 5A, Paper Feed Motor     |

#### Power Supply

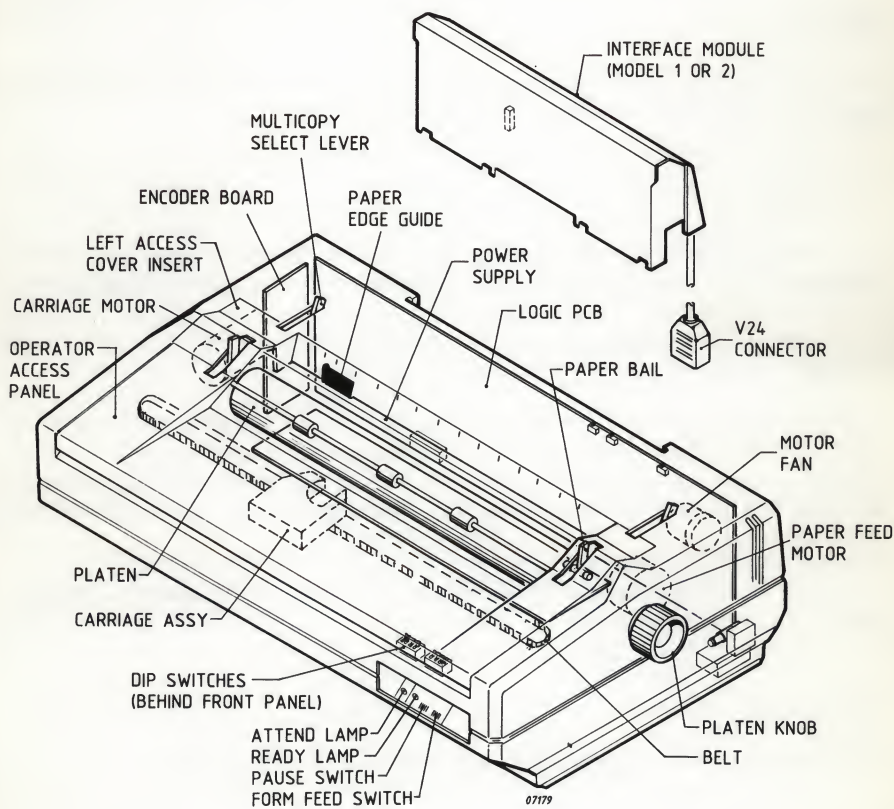
| FUSE | REMARKS          |
|------|------------------|
| F1   | 2A, AC Line Fuse |
| F2   | 5A, +5VDC Fuse   |

**NOTE:** Another fuse (2A) is present on rear side of printer near the mains switch.

## Operating

| CONDITION                                                                                  | READY LAMP | ATTEND LAMP |
|--------------------------------------------------------------------------------------------|------------|-------------|
| Normal printer operation                                                                   | On         | Off         |
| Pause switch depressed or operator attention required:<br>ribbon out, paper out, cover off | Blinks     | On          |
| Pause switch pressed                                                                       | Blinks     | Off         |
| Printer in check                                                                           | Off        | On          |

## Indicators



## **20.8.5 Maintenance**

### **Off-Line Self-Test**

#### **Printer Self-Test**

The Printer Self-Test is executed by the master microcomputer in the SPRINT 11 PLUS printer and exercises the printing mechanism and supporting electronics. A successful completion of the Self-Test indicates that all the circuitry after the printer control microcomputer is functioning properly. Printer Self-Test can be run while the printer is isolated from the host computer.

To initiate Printer Self-Test, turn on the power to the printer while pressing the Form Feed switch. The printer will perform an initialization sequence (Restore) and then begin continuously printing lines of all the characters on the printwheel in a "barber pole" swirl.

Printing will continue until power is turned off or until the Form Feed switch is pressed and held as the printer completes a line of characters.

#### **Terminal Self-Test**

The Terminal Self-Test is executed by the Qume connections control microcomputer, and exercises the printing mechanisms and supporting electronics together with the terminal microcomputer (RS232 only).

A successful completion of this Self-Test indicates that both the printer and the Qume connection module are functioning properly.

To initiate Terminal Self-Test, turn on the power to the printer while pressing the Pause switch. The printer will perform an initialization sequence (Restore) and then prints the software version number of the interface, the current dip-switch settings, the success or failure of the internal loop-back test and finally lines of all the characters on the printwheel.

Printing will continue until power is turned off or until the Pause switch is pressed and held as the printer completes a line of characters.

#### **On-Line Self-Test**

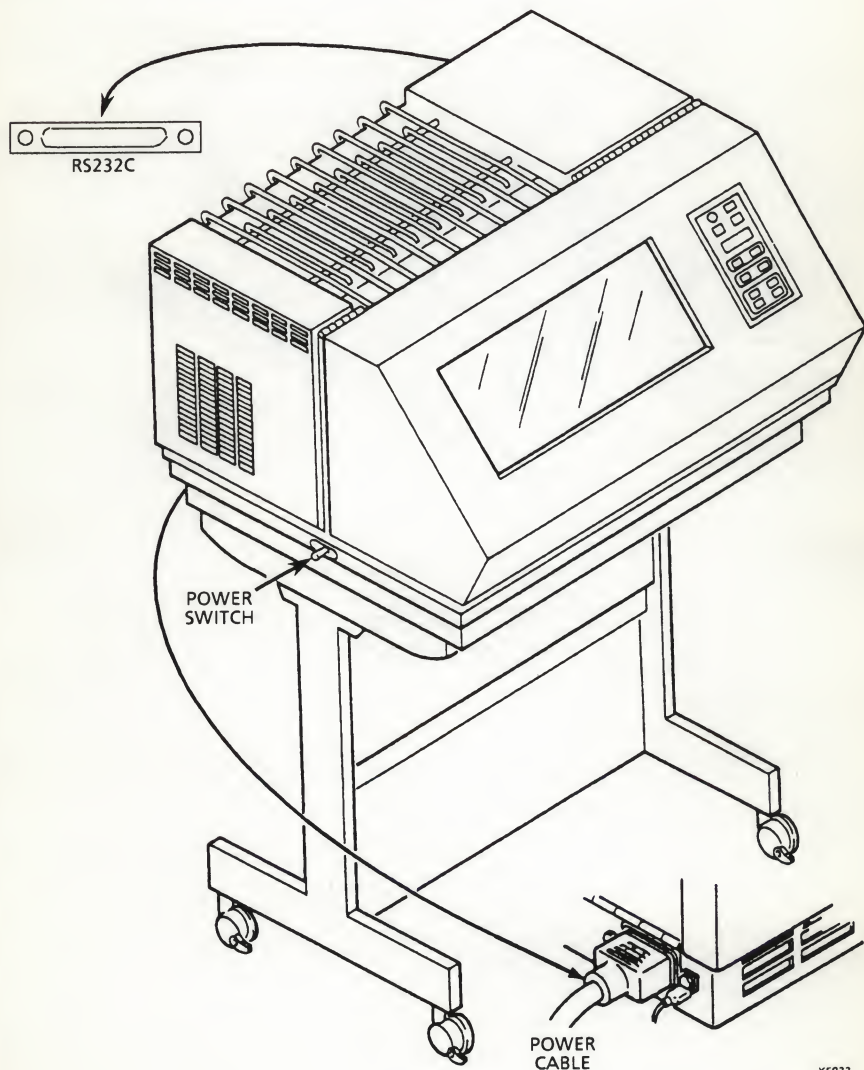
Use Service Processor cartridge SPS 003, 12-NC: 8709 010 21301.



## 20.9 P2963/P2966 Printronix (P6240/P6280)

The P2966 does differ from the P2963 in printing speed, the P2963 is a 400 lpm printer and the P2966 is a 800 lpm printer.

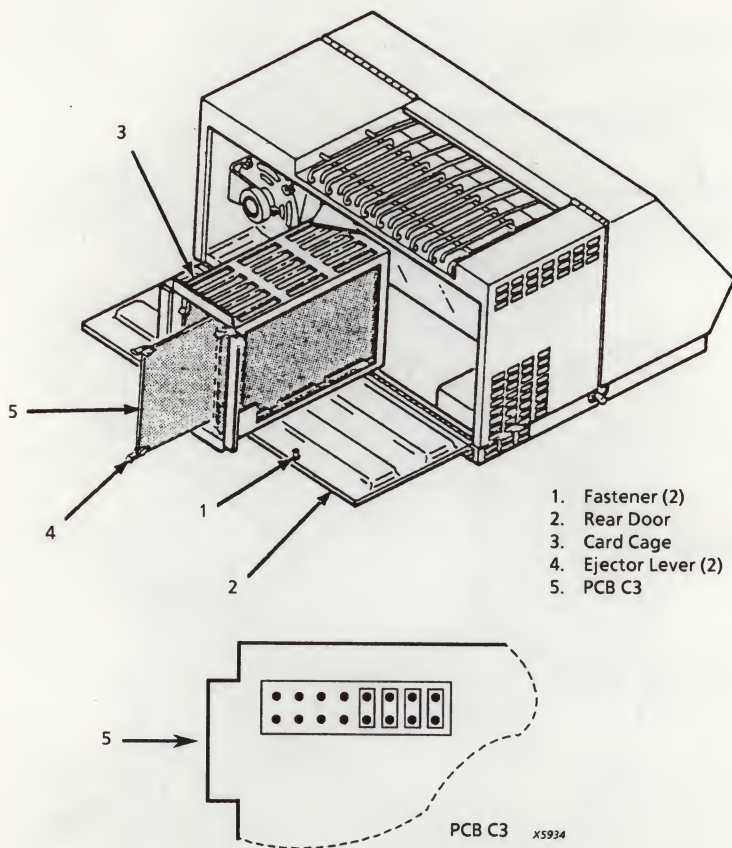
### 20.9.2 Connections



X5933

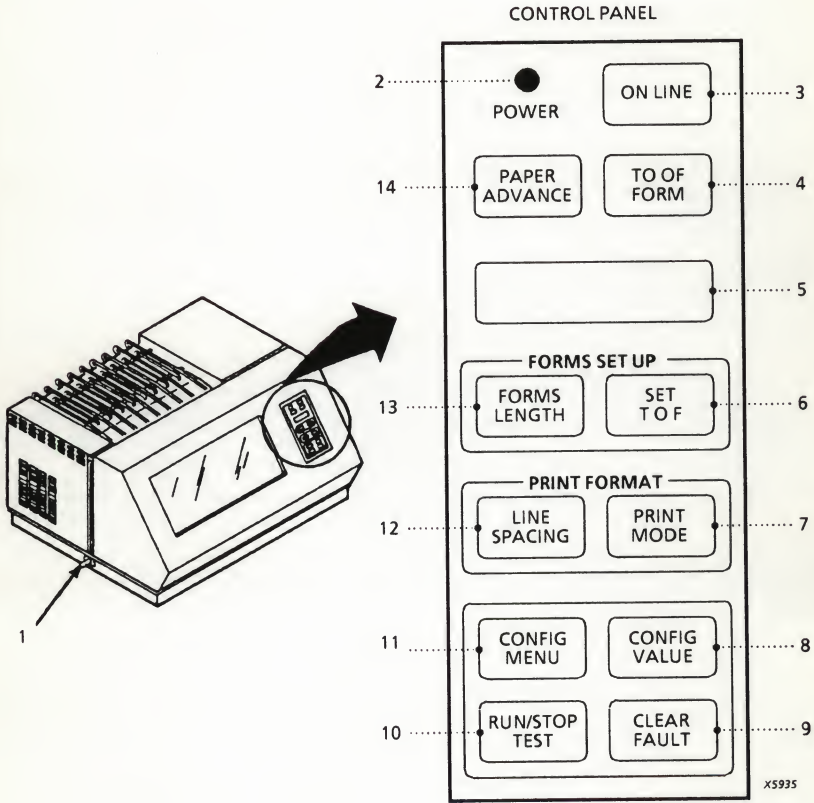
### 20.9.3 Strap Setting

The printer must be strapped for using the serial interface. This strap block can be found on the Logic PCB C3 on location 6A.



## 20.9.4 Installation

Setting of the printer should comply with the concerning printer interface file. See the Printer User's Manual. Setting can be done via the control pannel on the front cover of the printer.



| Key | Function                                                                                                                                                                                                                                                 |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Sets AC power on/off                                                                                                                                                                                                                                     |
| 2   | Indicates power is applied                                                                                                                                                                                                                               |
| 3   | Places printer on/off line                                                                                                                                                                                                                               |
| 4   | Advances paper one form length to top of next form                                                                                                                                                                                                       |
| 5   | Displays printer status and error messages                                                                                                                                                                                                               |
| 6   | Sets Top Of Form position                                                                                                                                                                                                                                |
| 7   | Selects and displays current print mode                                                                                                                                                                                                                  |
| 8   | Selects and displays individual parameters within configuration menu                                                                                                                                                                                     |
| 9   | When configuration values are displayed, this switch selects and displays the next configuration menu. When fault message is displayed, resets printer after fault message is corrected                                                                  |
| 10  | Executes one of the three basic functions: <ul style="list-style-type: none"> <li>1. Saves newly selected parameters or loads default parameters.</li> <li>2. Runs or stops configuration and self-tests.</li> <li>3. Runs or stops hex dump.</li> </ul> |
| 11  | Cycles through configuration menus                                                                                                                                                                                                                       |
| 12  | Selects and causes display of current line spacing in lines per inch                                                                                                                                                                                     |
| 13  | Selects and causes display of current forms length                                                                                                                                                                                                       |
| 14  | Advances paper one line whenb pressed momentarily or continuously as long as it is pressed.                                                                                                                                                              |

Before connecting to the mains, check the label at rear side of the printer if the voltage is correct.



## 20.9.5 Maintenance

### Printer Self-Tests

The printer contains several selftests that can be helpful in maintaining optimum printer performance. Each of these tests may be initiated from the control panel while in the 80 Column or 132 column printer test menus.

#### Available self-tests are:

- Shift Recycle                      A "sliding" alphanumeric pattern useful in identifying missing or misformed characters, improper vertical alignment, or vertical compression.
- All E's                              A pattern of all uppercase letter E's useful in identifying missing characters, misplaced dots, smeared characters, or light/dark character variations.
- E's and Form Feed              A pattern of all E's followed by a form feed useful in identifying paper motion or reeding problems.
- All H's                              A pattern of all uppercase letter H's useful in identifying missing characters, misplaced dots, smeared characters, or improper vertical alignments
- Underline Only                  An underline pattern useful in identifying vertical misalignment.
- Shuttle and Ribbon              A test to exercise shuttle and ribbon action to verify proper operation.

#### To run the self-tests:

1. Place the printer offline
2. Simultaneously press RUN/STOP TEST and CONFIG MENU to enable the control panel.
3. Repeatedly press CONFIG MENU until the 80 or 132 COLUMN PAPER printer test message is displayed as required.
4. Repeatedly press CONFIG VALUE until the appropriate test is displayed.
5. Press RUN/STOP TEST to begin the test; press RUN/STOP TEST again to stop the test and to return to offline.

## Fault Messages

If a problem should arise, the printer displays certain fault messages. These messages indicate the nature and location of user and service correctable errors. These messages and their explanation are listed below.

| DISPLAY FAULT CONDITION       | EXPLANATION                           |
|-------------------------------|---------------------------------------|
| Paper Out                     | Paper Out                             |
| Platen Open                   | Platen Open                           |
| Paper Jam                     | No paper motion                       |
| Check Ink Ribbon              | Ribbon Fault                          |
| 30 Volts                      | DC Power Supply Fault                 |
| Shuttle Jam                   | Shuttle not operating at proper speed |
| STD (or ALT) font XX          | Upper/Lower font PROM error           |
| MEMORY FAULT<br>Program XX    | Upper/Lower program PROM error        |
| MEMORY FAULT<br>System RAM XX | Upper/Lower system RAM error          |

## Hex Code Printout

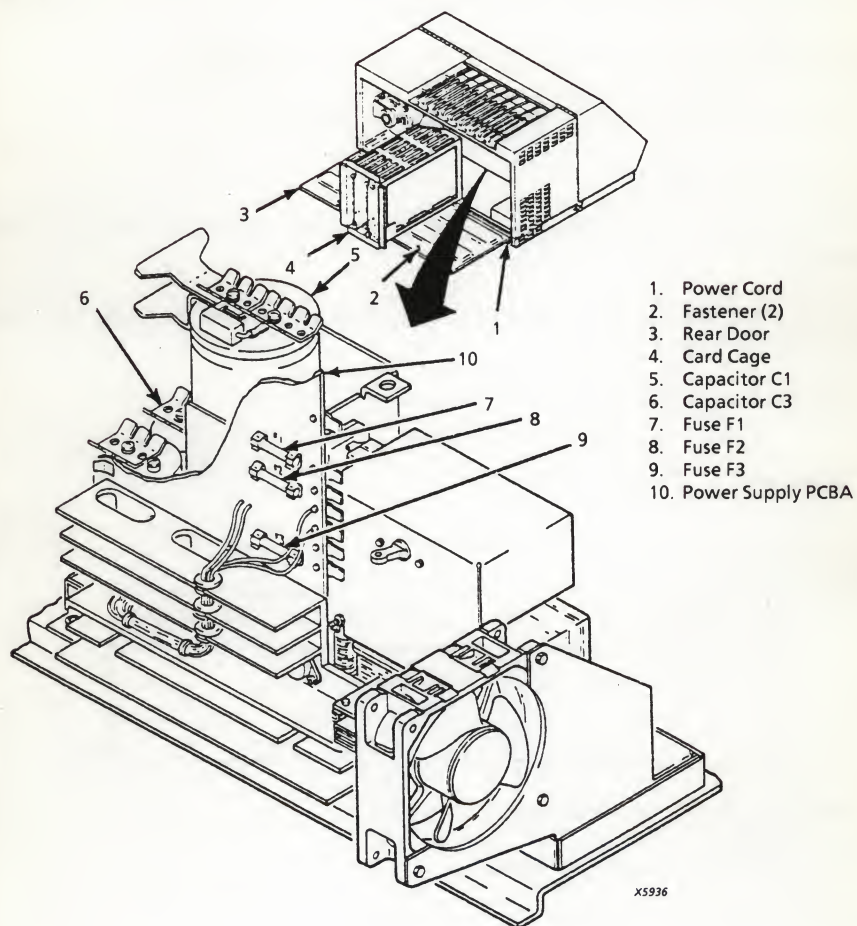
To verify a proper host computer to printer interface, the data stream sent from the host can be printed in hexadecimal code with ASCII characters equivalents. Nonprintable characters are indicated with a period symbol. A "p" before the hex code indicates an active Paper Instruction (PI) line; a blank space before the hex code indicates an inactive PI line.

To make the Hex dump perform the following steps:

1. Place the printer offline
2. Simultaneously press RUN/STOP TEST and CONFIG MENU to enable the control panel.
3. Repeatedly press CONFIG MENU until the PRINTDATA STREAM IN HEX CODE message is displayed.
4. Press RUN/STOP TEST. The display will indicate the hex dump mode.
5. Send the data from the host.
6. Press RUN/STOP TEST again to stop the hex dump and to return to offline.

7. Simultaneously press RUN/STOP TEST and CONFIG MENU to disable the control panel.

## Fuses



**a. Removal:**

**WARNING**

**High electrical potentials may be present at power supply even with power disconnected. Exercise care; severe injury or death is possible.**

1. Disconnect power cord (1). Wait five minutes before continuing.
2. Loosen two fasteners (2) and allow rear door (3) to wing open.
3. Swing out card cage (4)
4. On capacitor C1 (5), temporarily install a 1K, 10W resistor between C1 + and ground.
5. On capacitor C3 (6), temporarily install a 1K, 10W resistor between C3 + and ground.
6. Inspect fuses F1 (7), F2 (8) and F3 (9) on power supply PCB (10).

**b. Installation:**

1. Replace any blown fuse with fast blow type;

| FUSE | TYPE | Volts (P2966) | Volts (P2963) |
|------|------|---------------|---------------|
| F1   | 8AFB | + 36          | + 8           |
| F2   | 3AFB | + 5           | -30           |
| F3   | 3AFB | -36           | + 28          |

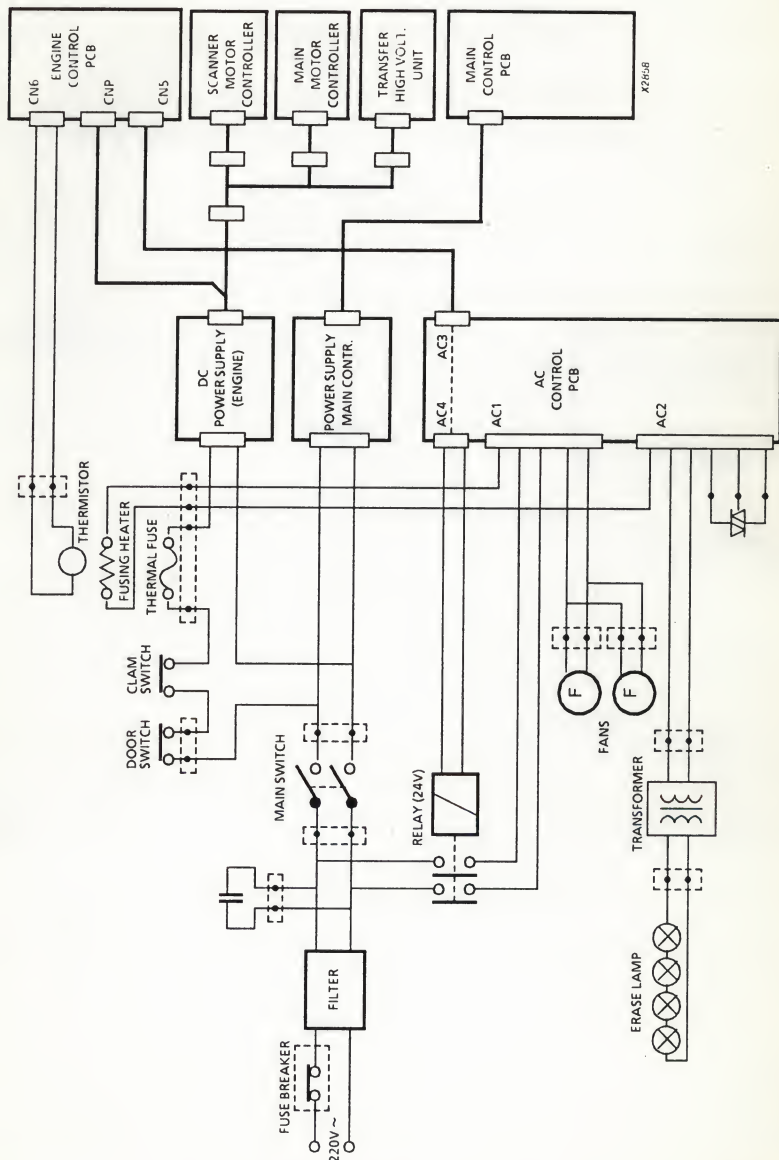
2. Remove temporary resistors installed on C1 (5) an C3 (6)
3. Swing card cage (4) back into place.
4. Close rear door (3) and tighten two fasteners (2)
5. Reconnect power cord (1)

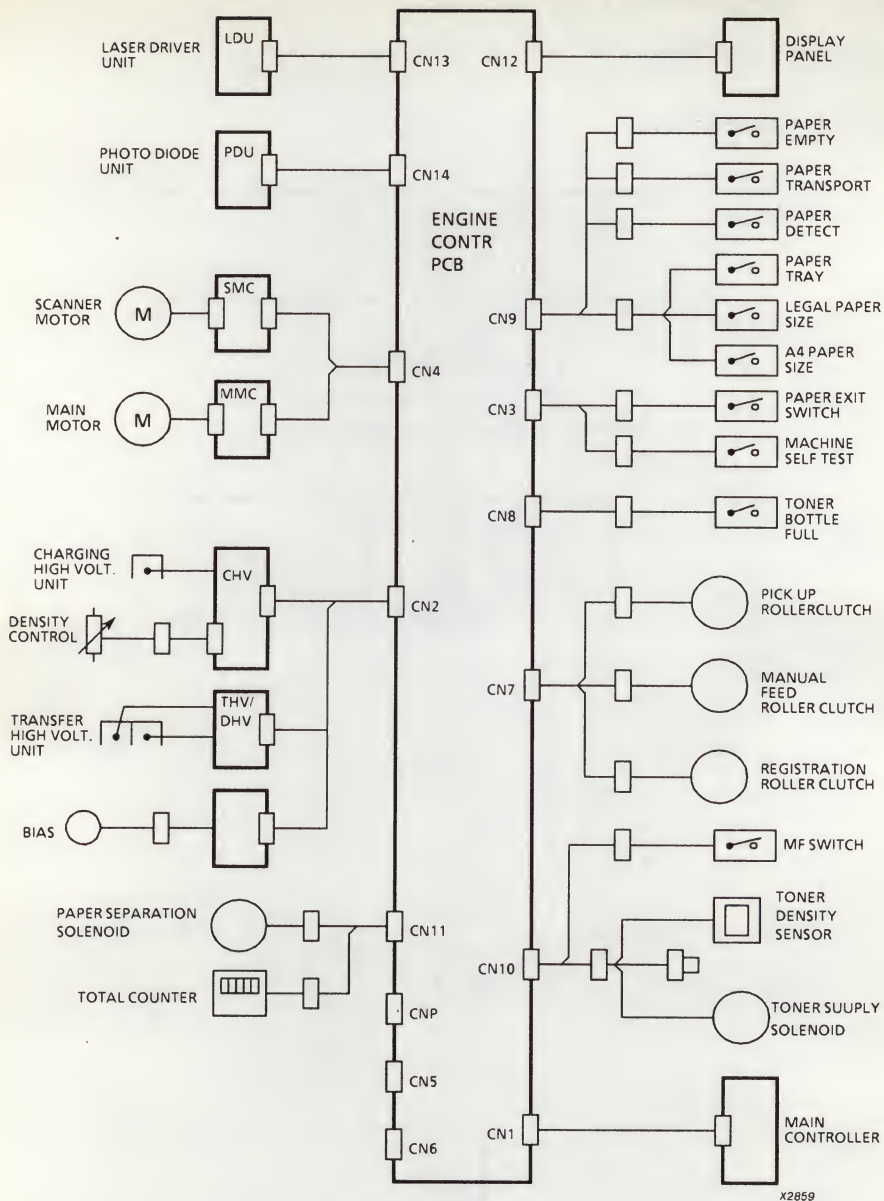


## 20.10 P2973 (Qume Laser Ten + )

The P2973 is End Commercial Delivery.

### 20.10.2 Connections





## Main Controller

| CONNECTOR | REMARKS                                            |
|-----------|----------------------------------------------------|
| SJ1       | Interface module connection                        |
| SJ2       | To engine controller                               |
| SJ3       | Power connection from main controller power supply |
| SJ4       | To fan                                             |
| FJ10      | To digifont cartridges                             |
| FJ1       | To digifont cartridges                             |
| FJ2       | To digifont cartridges                             |

## Engine Controller

| CONNECTOR | REMARKS                                                                           |
|-----------|-----------------------------------------------------------------------------------|
| CN1       | To main controller                                                                |
| CN2       | To bias and charge high tension units                                             |
| CN3       | To paper exit switch, to machine self test switch                                 |
| CN4       | To scanner motor and main motor control                                           |
| CN5       | To AC power supply                                                                |
| CN6       | To thermistor                                                                     |
| CN7       | To all three clutches                                                             |
| CN8       | To toner bottle full switch                                                       |
| CN9       | To paper size, paper tray, paper detect, paper empty and paper transport switches |
| CN10      | To manual feed switch, to toner density sensor and to toner supply solenoid       |
| CN11      | To paper separator solenoid and to the page counter                               |
| CN12      | To operator panel                                                                 |
| CN13      | To laser diode unit                                                               |
| CN14      | To photo diode unit                                                               |
| CNE       | Not used                                                                          |
| CNP       | Power connection from DC power supply                                             |

## DC Power Supply

| CONNECTOR | DESCRIPTION                |
|-----------|----------------------------|
| CN1       | To mains input             |
| CN2       | To engine controller board |

## Main Controller Power Supply

| CONNECTOR | DESCRIPTION              |
|-----------|--------------------------|
| CN        | To on off switch         |
| CN        | To main controller board |

## AC Power Supply

| CONNECTOR | DESCRIPTION                      |
|-----------|----------------------------------|
| AC1       | To fans                          |
| AC2       | To heater, erase lamps and triac |
| AC3       | To engine controller board       |
| AC4       | To mains relay                   |

## Main Motor Controller

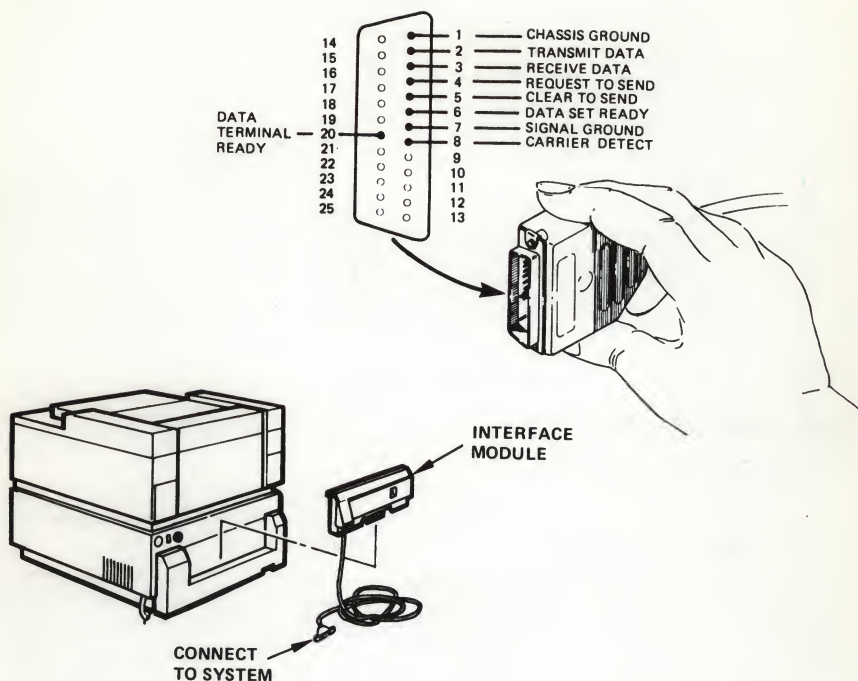
| CONNECTOR | DESCRIPTION          |
|-----------|----------------------|
| CN1       | To engine controller |
| CN2       | To main motor        |

## Scanner Motor Controller

| CONNECTOR | DESCRIPTION          |
|-----------|----------------------|
| CN101     | To engine controller |
| CN102     | To scanner motor     |

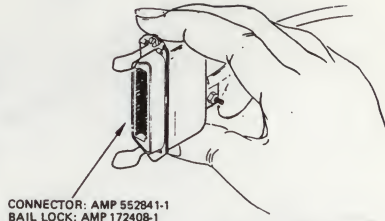
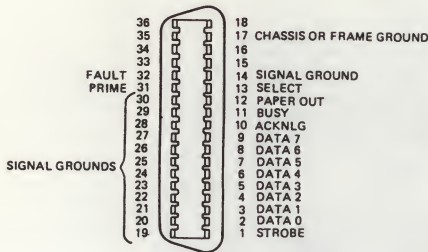


## Interface Specification RS-232C



| PIN NO. | SIGNAL NAME         | FUNCTION                                                                                    |
|---------|---------------------|---------------------------------------------------------------------------------------------|
| 1       | Protective Ground   | Frame ground                                                                                |
| 2       | Transmit            | Serial ASCII coded data transmitted from the printer to the host computer                   |
| 3       | Receive             | Serial ASCII coded data received by the printer                                             |
| 4       | Request to Send     | Output from the printer                                                                     |
| 5       | Clear to Send       | Input to the printer (signal is not used by the printer)                                    |
| 6       | Data Set Ready      | Input to the printer (signal is not used by the printer)                                    |
| 7       | Signal Ground       | Ground reference for all data and control signals. This pin is internally strapped to pin 1 |
| 8       | Carrier Detect      | Input to the printer (signal is not used by the printer)                                    |
| 20      | Data Terminal Ready | Output from the printer                                                                     |

## Interface Specification Centronics



### 20.10.3 Strap Settings

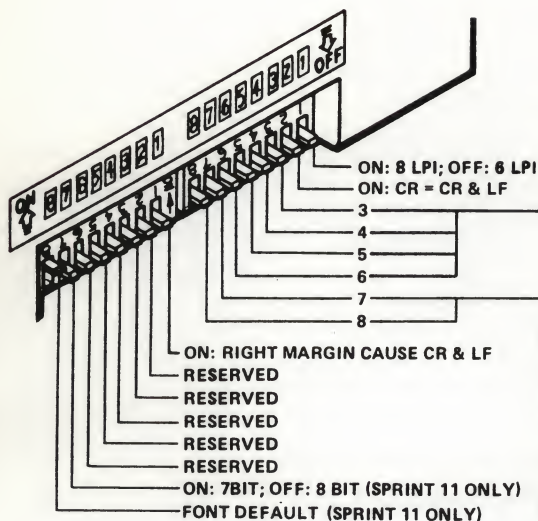
#### Main Controller (Hard Straps)

| STRAP NAME | STRAP | DESCRIPTION                  |
|------------|-------|------------------------------|
| RST1       | Open  | Power on reset               |
| RST2       | Open  | Reset image processor        |
| JP1        | Open  | Pause signal                 |
| JP2        | Open  | Manual feed switch           |
| JP3        | Open  | Data selection               |
| JP4        | Open  | Data selection               |
| JP5        | 1 - 2 | Selection 256K resident font |
| JP6        | Open  | Address selection            |
| JP7        | 1 - 2 | Memory ROM 256K selected     |

#### Engine Controller (Hard Straps)

| STRAP NAME | STRAP  | DESCRIPTION                    |
|------------|--------|--------------------------------|
| JP1        | Open   | HORP ≠ PAGP                    |
| JP2        | Closed | HORP grounded                  |
| JP3        | Open   | Begin diode (neg.)             |
| JP4        | Open   | Laser data manipulation        |
| JP5        | Closed | Begin diode (pos.)             |
| JP6        | Closed | Laser data manipulation        |
| JP7        | Closed | DOTP not used                  |
| JP8        | Closed | Laser data manipulation        |
| JP9        | Open   | Laser data manipulation        |
| M - ON     | Open   | Main motor disable (strapable) |

## Dip Switch Settings (Backpanel)



FORM LENGTH  
SETTING (INCHES)

| 6   | 5   | 4   | 3   | FL    |
|-----|-----|-----|-----|-------|
| OFF | OFF | OFF | OFF | 3     |
| ON  | OFF | OFF | OFF | 3.5   |
| OFF | ON  | OFF | OFF | 4     |
| OFF | OFF | ON  | ON  | 5     |
| ON  | ON  | OFF | OFF | 5.5   |
| OFF | OFF | ON  | OFF | 6     |
| ON  | OFF | ON  | OFF | 7     |
| OFF | ON  | ON  | OFF | 8     |
| ON  | ON  | ON  | OFF | 8.5   |
| ON  | ON  | ON  | ON  | 9     |
| OFF | ON  | ON  | ON  | 10    |
| OFF | OFF | OFF | ON  | 11    |
| ON  | OFF | OFF | ON  | 11.66 |
| OFF | ON  | OFF | ON  | 12    |
| ON  | ON  | OFF | ON  | 14    |

| 8   | 7   | PITCH |
|-----|-----|-------|
| OFF | OFF | 10    |
| ON  | OFF | 12    |
| OFF | ON  | 15    |

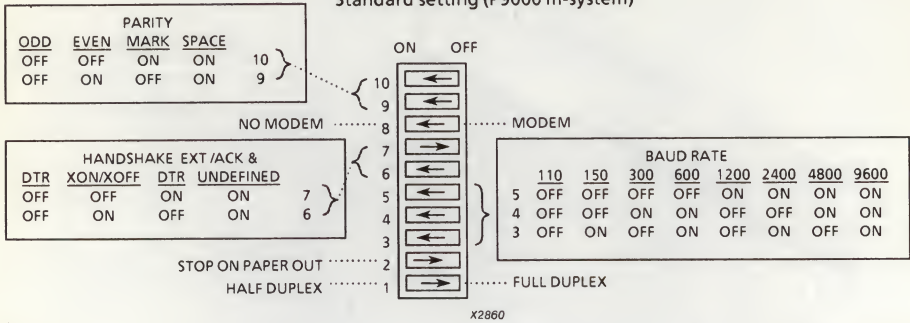
(SPRINT 11 ONLY)

DEFAULT SETTING P9000  
m-system

|   |   |     |    |
|---|---|-----|----|
| 1 | = | OFF | A. |
| 2 | = | ON  |    |
| 3 | = | ON  |    |
| 4 | = | OFF |    |
| 5 | = | OFF |    |
| 6 | = | ON  |    |
| 7 | = | OFF |    |
| 8 | = | OFF |    |
| 1 | = | OFF | B. |
| 2 | = | OFF |    |
| 3 | = | OFF |    |
| 4 | = | OFF |    |
| 5 | = | OFF |    |
| 6 | = | OFF |    |
| 7 | = | OFF |    |
| 8 | = | ON  |    |

# RS232C Interface Board

RS 232 Module switches  
Standard setting (P9000 m-system)



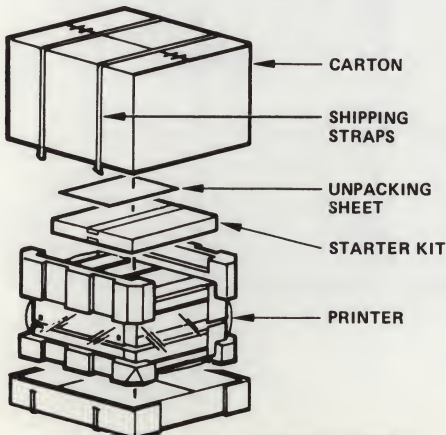
DEFAULT SETTING P9000 m-system

|   |   |     |    |   |     |
|---|---|-----|----|---|-----|
| 1 | = | OFF | 6  | = | ON  |
| 2 | = | OFF | 7  | = | OFF |
| 3 | = | ON  | 8  | = | ON  |
| 4 | = | ON  | 9  | = | ON  |
| 5 | = | ON  | 10 | = | ON  |

## 20.10.4 Installation

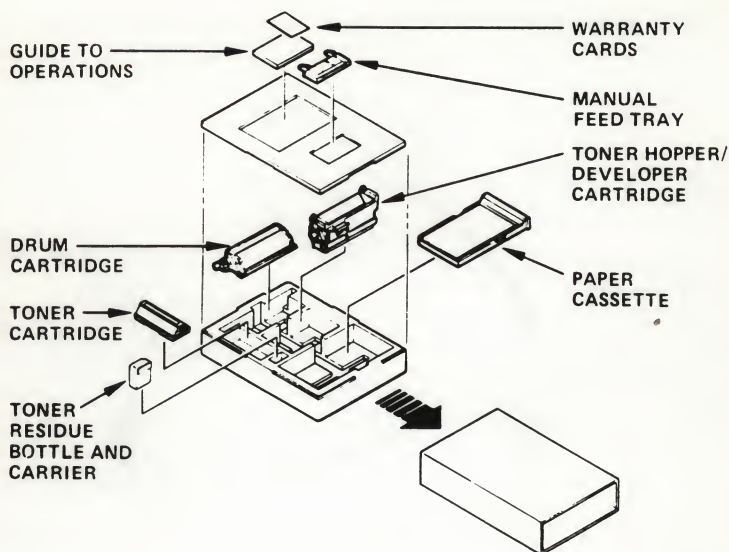
### Unpacking

- Cut the shipping straps from the outside of the carton.
- Lift only the outer carton from the base pallet (do not open the flaps).

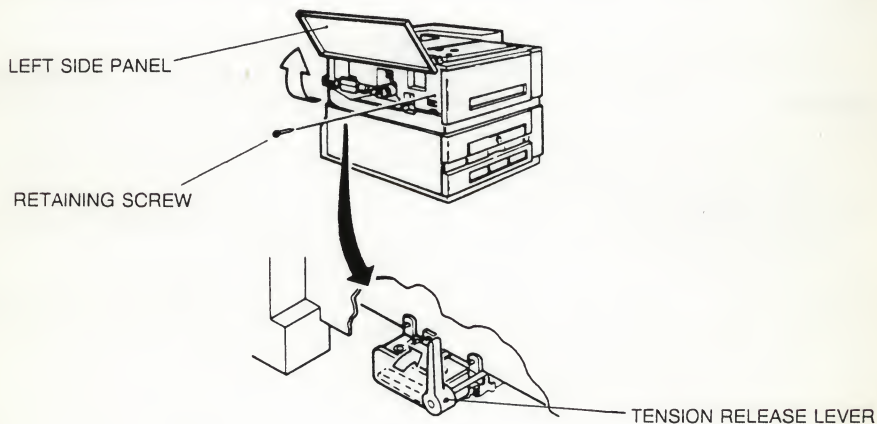




- Unpack the starter kit.



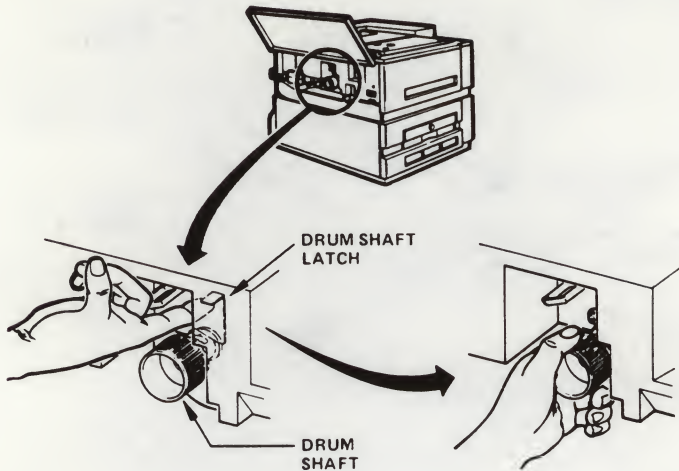
- Use a screwdriver to remove the retaining screw from the inside.
- Place the tension release lever in the correct position (upward position).



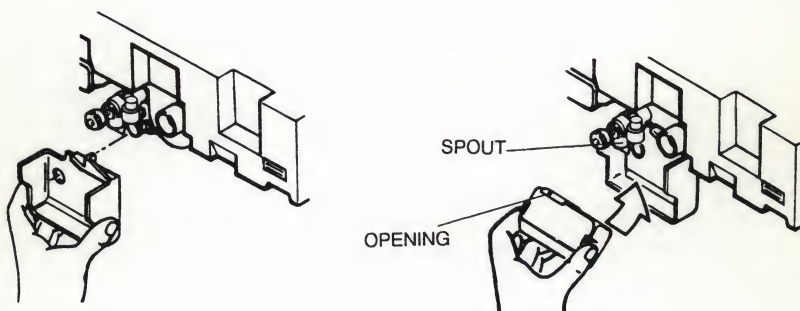
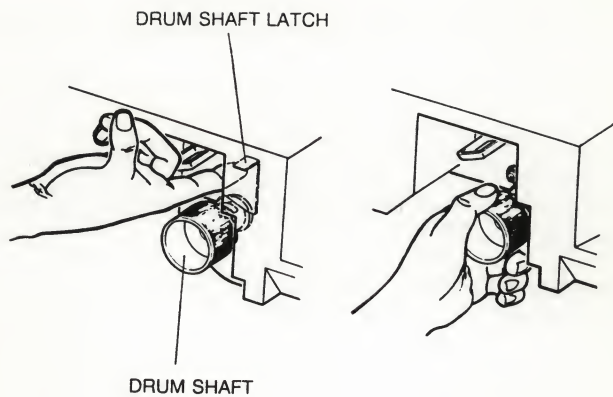
- Remove the foam packing blocks on top of the separator pad as well as the shipping tape on the transfer corotron unit.

## Installing the Drum

- Push the latch above the drum shaft knob up.
- Twist and pull the drum shaft out and set it aside.



- Line the drum assembly up with the locator pins on the printer and set it onto the lower part of the printer.
- Carefully rotate the drum until you can grasp the paper tab. Pull the protective cover off slowly.
- Pull out the wire loop at the right end of the drum assembly.
- Leave the left side panel open but close the printer, by pushing downward carefully until it latches. Do not force it. If it does not latch, realign the drum assembly with the pins.
- Gently insert the drum shaft that you removed earlier. You may have to wiggle or rotate the shaft a little to help the drum align aside.
- When the shaft is inserted completely, push the drum shaft latch downward to lock the shaft in place. It only locks when the shaft is fully in place.
- Separate the residue bottle from the carrier in the starter kit.
- Hang the carrier on the support that looks like a metal button attached to the drum unit. Put in place the residue bottle. If the bottle is not inserted properly, a clicking sound will be heard every time the drum rotates.



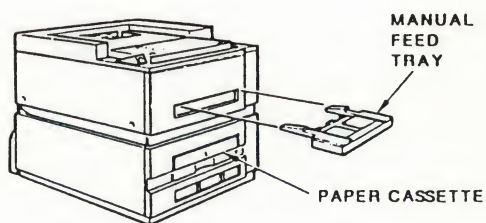
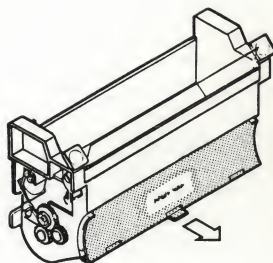
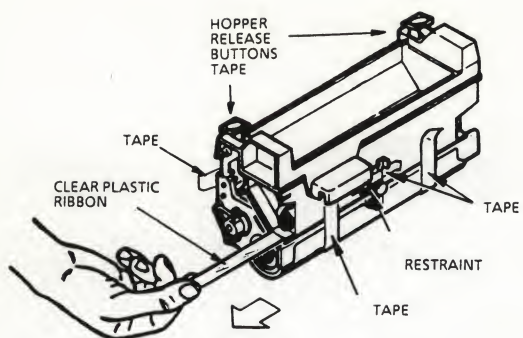
### **Installing the Toner / Developer Unit**

- Remove the shipping tape and packing restraint.
- Grasp the clear plastic ribbon coming from between the two parts and pull firmly and slowly until the entire ribbon comes free. Also remove lower.
- Insert the unit by pressing the two hopper release buttons.
- Insert a toner cartridge, don't remove the seal yet! (toner will be spilled after the seal is removed).
- Line toner cartridge up with the two holes on the end of the cartridge with the pins in the hopper.
- Now remove seal slowly and discard of it.

### **Installing the Paper Feed Trays**

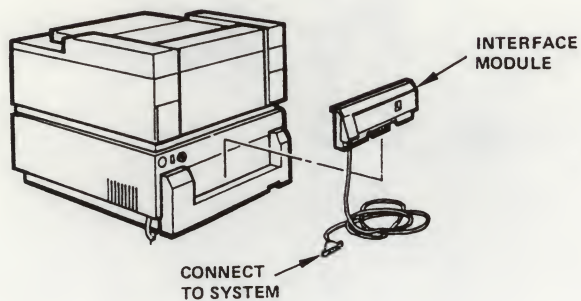
- Remove the paper cassette from the starter kit and insert it onto the printer, lifting slightly as you push it into place.
- Insert manual feed tray above the paper cassette by lifting slightly as the tabs enter allowing the tray to lock in place.



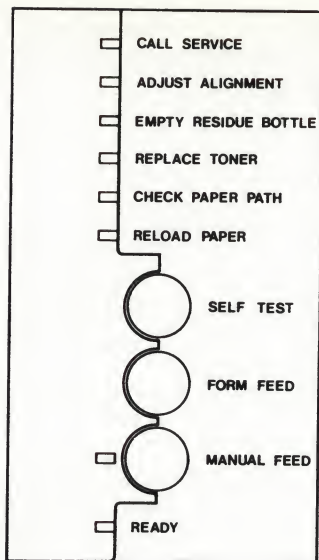


### Installing the Interface Module

- When the printer is off, carefully slide the module (label side out) into the slot at the rear of the printer.
- Push firmly downward until the connector at the bottom is fully.



## Operator Panel



- The operator panel has three controls and eight indicators:

- Ready indicator : Continuously on when ready
- Manual feed switch : Puts the printer in the manual feed mode and expects a sheet of paper.
- Form Feed Switch : Stops all further processing for the page in progress and prints the page. This control also performs a controller self test together with the powering on.
- Self Test Switch : Prints interface module information (can only be activated when interface module is installed).
- Reload Paper Indicator : Out of paper message.
- Check Paper Path Indicator : Paper jam indication.
- Replace Toner Indicator : Toner cartridge is empty (still 30 sheets can be printed).
- Empty Residue Bottle Indicator : Toner residue bottle is full. If this indicator is on and the bottle is not full, push the little plunger button on the toner exit sprout to clear the channel.
- Adjust Alignment Indicator : Toner / developer unit is not properly seated.
- Call Service Indicator : Mostly engine controller problems.

## Paper Specifications

Long grain paper, 60 - 90 g/m<sup>2</sup> plain paper should be used.

Paper that is not within the range may cause misfeeds, paperjams, or excessive mechanical wear. Thickness 0.086 - 0.107 mm.

## 20.10.5 Maintenance

### Off Line Self Tests

- Engine Self Test:

The engine self test checks the mechanical functioning of the printer.

Push the self test button on the back of the printer, the printout should look like closely spaced vertical lines.

This test can also be activated when the main controller isn't installed.

- Controller Self Test:

The controller self test checks the printers controller. It is performed when the printer is turned on when the form feed button is pressed until the ready lamp stops flashing. The output looks like a "barber pole".

- Confidence Self Test:

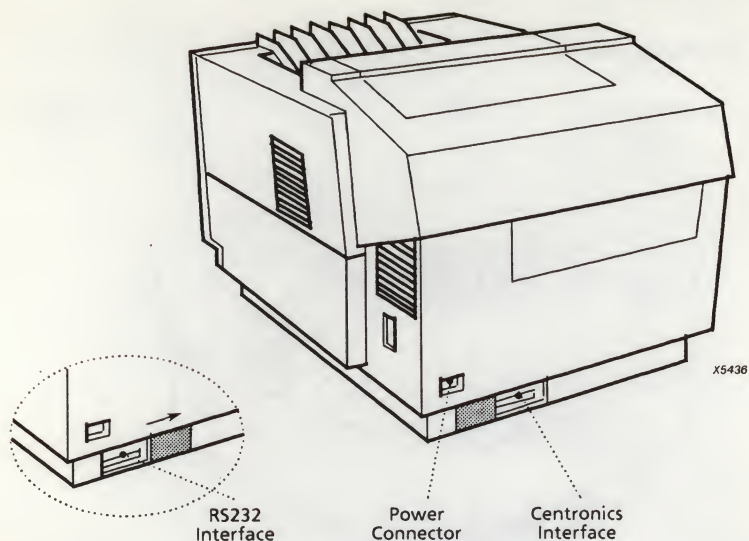
This self test is activated with the self test button on the operator panel.

This test only works with the interface module installed. When the self test completes the interface module information and font availability are printed.





## 20.11.2 Connections



### Mechanism Controller Board

| CONNECTOR | DESCRIPTION                                       |
|-----------|---------------------------------------------------|
| CN1       | Power Supply Unit / Cover Interlock Connector     |
| CN2       | Power Supply Unit                                 |
| CN3       | Outside Controller                                |
| CN4       | Inside Controller                                 |
| CN5       | Second Hopper                                     |
| CN6       | Clutches and Sensors                              |
| CN7       | Optical Unit                                      |
| CN8       | Control Panel                                     |
| CN9       | Control Panel                                     |
| CN10      | Main Motor                                        |
| CN11      | HV2 Power Supply Unit                             |
| CN12      | HV1 Power Supply Unit                             |
| CN13      | Developer Unit / Eraser LED / Paper Eject Sensor  |
| CN14      | Solid State Relay                                 |
| CN15      | Cover Interlock Connector / Jam Cover Open Switch |
| CN16      | Fusing Unit                                       |
| CN17      | -                                                 |

## Control Panel PC Board

| CONNECTOR | DESCRIPTION                |
|-----------|----------------------------|
| CN1       | Mechanism Controller Board |
| CN2       | Mechanism Controller Board |

## HV1 Power Supply Unit

| CONNECTOR | DESCRIPTION    |
|-----------|----------------|
| -HV       | Charge C       |
| V.8       | Developer Unit |

## HV2 Power Supply Unit

| CONNECTOR | DESCRIPTION      |
|-----------|------------------|
| + HV      | Transfer Charger |
| ACH       | AC Discharger    |

## Developer Unit

| CONNECTOR | DESCRIPTION                          |
|-----------|--------------------------------------|
| CNP41     | Mechanism Controller Board / HV1 PSU |

## Power Supply Unit

| CONNECTOR | DESCRIPTION                |
|-----------|----------------------------|
| CN1       | Net Filter                 |
| CN2       | Mechanism Controller Board |
| CN3       | Mechanism Controller Board |
| CN4       | Fuser Fan                  |
| CN5       | Product Fan                |

## Fusing Unit

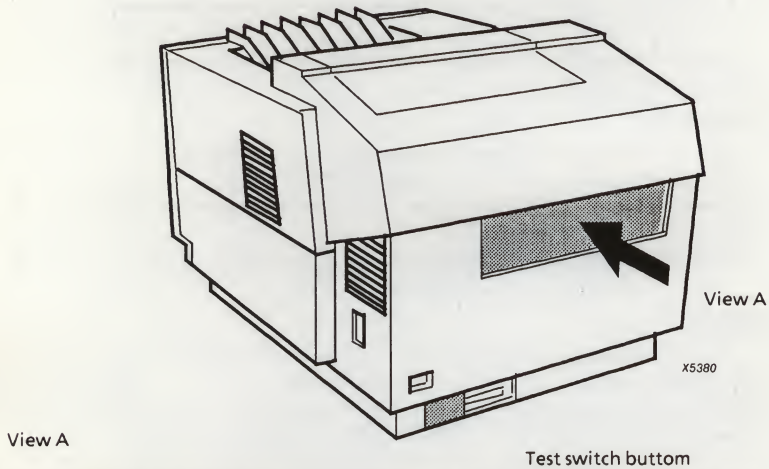
| CONNECTOR | DESCRIPTION                                         |
|-----------|-----------------------------------------------------|
| CNP31     | AC-Interlock Switching / Mechanism Controller Board |

### 20.11.3 Strap Setting

(HARD) straps are not applicable.

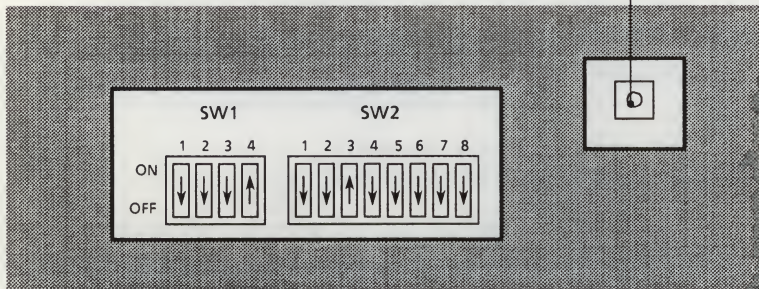
Switch setting.

There are 2 switches (S1 and S2) on the Mechanism Controller Board.  
To set these switches the rear cover (see 20.9.1) must be removed.



View A

Test switch button





## SW1 Setting

| SWITCH | SETTING | DESCRIPTION                                      |
|--------|---------|--------------------------------------------------|
| 1      | OFF     | } Adjustment of vertical printing start position |
| 2      | OFF     |                                                  |
| 3      | OFF     |                                                  |
| 4      | ON      |                                                  |

## SW2 Setting

| SWITCH | SETTING                | DESCRIPTION                                                       |
|--------|------------------------|-------------------------------------------------------------------|
| 1      | ON<br>OFF *            | No alarm when paper jam detected<br>Alarm when paper jam detected |
| 2      | ON                     | Paper jam will not be detected                                    |
| 2      | OFF *                  | Paper jam will be detected                                        |
| 3      | 3 4<br>240 dpi OFF OFF | Print Resolution Setting                                          |
| 4      | 300dpi ON OFF*         |                                                                   |
|        | 400dpi OFF ON          |                                                                   |
| 5      | ON (B4)<br>OFF (A4) *  | A4 / B4 Model Setting                                             |
| 6      | ON<br>OFF *            | } Test Mode Setting                                               |
|        | ON<br>OFF *            |                                                                   |
|        | ON<br>OFF *            |                                                                   |

\* default strap setting

## 20.11.4 Installation

Strapsetting of the printer should comply with the concerning printer interface file. See the Printer User's Manual.

Before connecting to the mains, check the label at rear side of the printer if it is strapped for the correct voltage.

For inserting the font cards see also the Printer User's Manual.

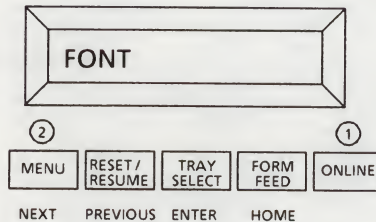
## 20.11.5 Maintenance

### Test and Diagnostics

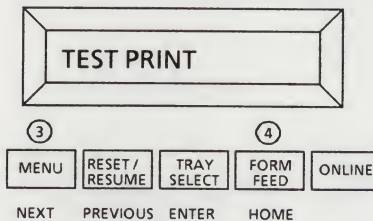
#### Off-line tests

The printer has a test print function to allow you to check printer operation and print quality. The test print page prints a "barber pole" pattern.

1. Press the ON-LINE button to put the printer off-line, then press the SETUP button to put it in setup mode.

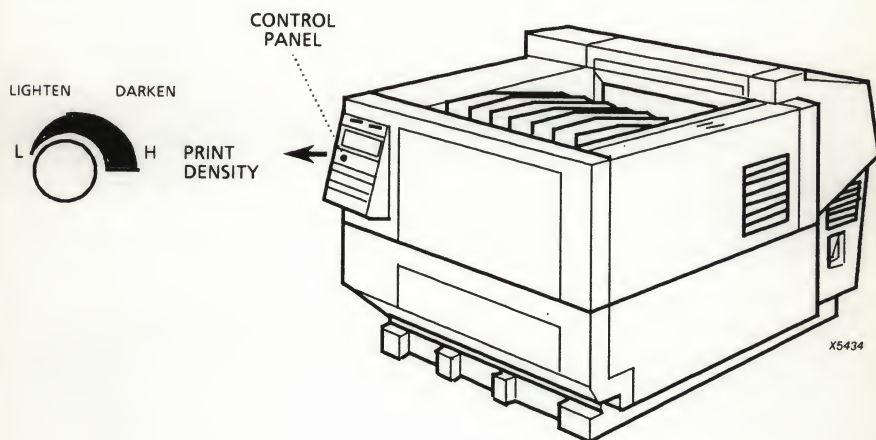


2. Press the FUNCTION button until the words TEST PRINT appear, then press the SET button to start printing. The printer will print a test page and then stop.



3. If the print is too dark or light, adjust it with the print density knob on the control panel.

You may have good results by increasing the density (darken it) when characters are printed and by decreasing the density (lighten it) when a halftone image is printed.



4. Press the EXIT button to put the printer off-line.





## 20.12 P2982

The P2982 Fujitsu RX7300 is End Commercial Delivery.

The P2982, Fujitsu RX7300 Laser printer, is deliverable and known in the P9000 m-series as the P2982-017.

This printer P2982-017 is a standard version, printing 17 pages per minute. The printer is equipped with a centronics interface and the main voltage input is 240VAC.

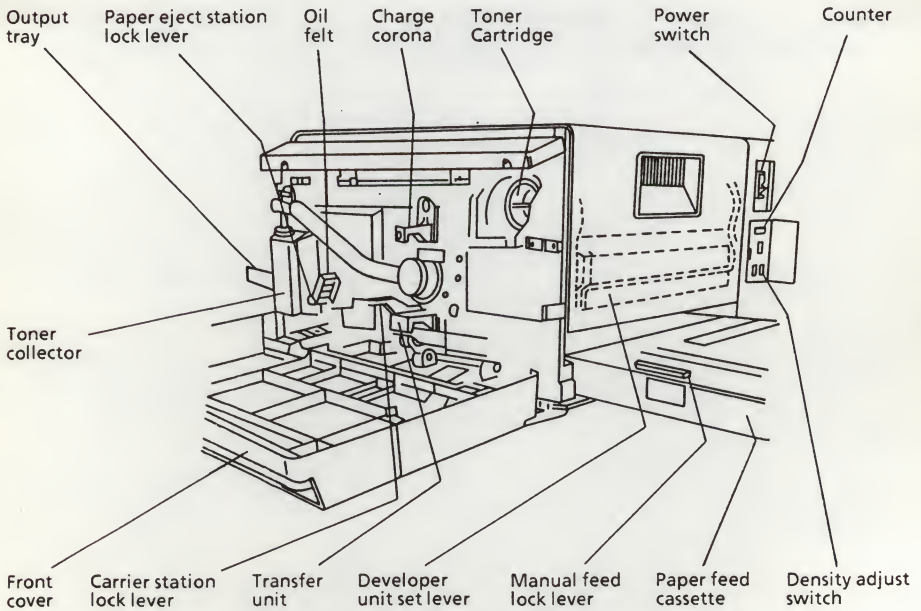
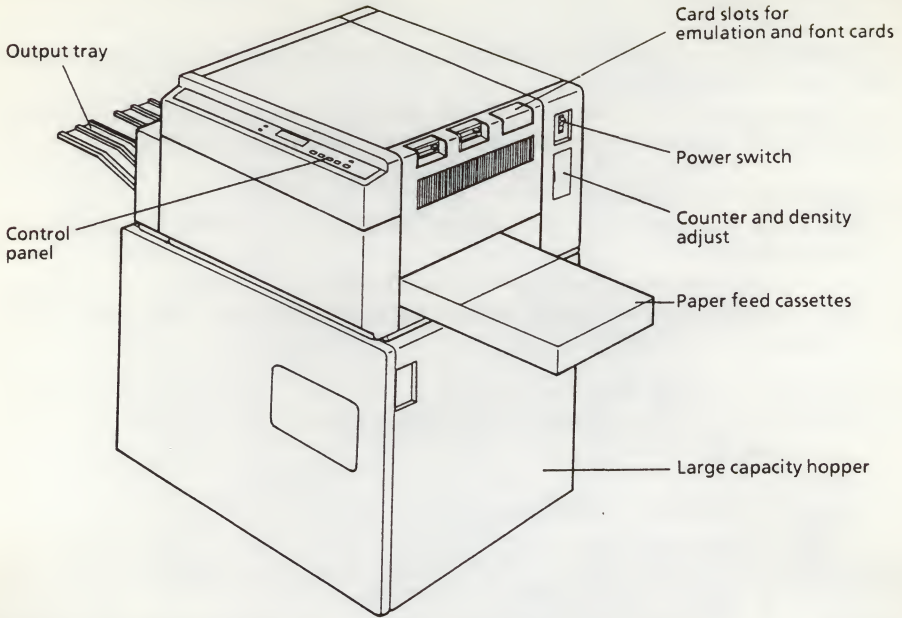
The options to this printer are :

- Font cards, maximal 3 can be installed. The font cards are the same as for the P2975 (RX7200).
- Second paper cassette, fits underneath the P2982.
- Large capacity hopper, approximately 1000 sheets of paper. This large capacity hopper acts as a printer table.

The consumables for the P2982 (RX7300) are :

- Toner cartridge (approximately for 6000 printed pages).
- Toner collector.
- Oil felt.
- Drum (approximately for 65000 pages).
- Transfer unit (approximately for 65000 pages).
- Cleaning unit (approximately for 65000 pages).
- Erase unit (approximately for 6000 printed pages).
- Fuser unit
  - Pressure roll (200000 pages)
  - Cleaning felt (12000 pages).
- Ozon filter (130000 pages).

## 20.12.1 Characteristics



## 20.12.2 Connections

### Power connection

The power cable has to be connected to the mains inlet at the rear (left side) of the printer. The power supply of the printer cannot be restrapped for another mains voltage.

### Interface connection

The P2982-017 does have a parallel Centronics interface, so the printer has to be connected to a parallel printer port of the P9000 m-series system. The interface connector is at the rear (right side) of the printer.

The P2987 does need the select-in signal (SLCT IN active low) from the system, the system does not supply this signal. For this reason the printer cable has to be modified. Pin 36 of the cable connector at the printer side must be put to ground, pin 16, 17, 19 thru 30 and 33 are ground.

**CAUTION :** *The DB25 connector at the rear of the printer (right side) is **NOT** an RS-232C connector. This connector is used for the large capacity hopper, when installed.*

## 20.12.3 Strap Setting

There are no straps or switches to set. All straps on the printed circuit boards inside the P2982 (RX7300) are factory set.

All settings for the printer must comply with the data in the system's printer model and interface file. The necessary selections have to be made via the SETUP MENU and the SELECT MENU. These MENU's are selected via the control keys of the operator's panel.

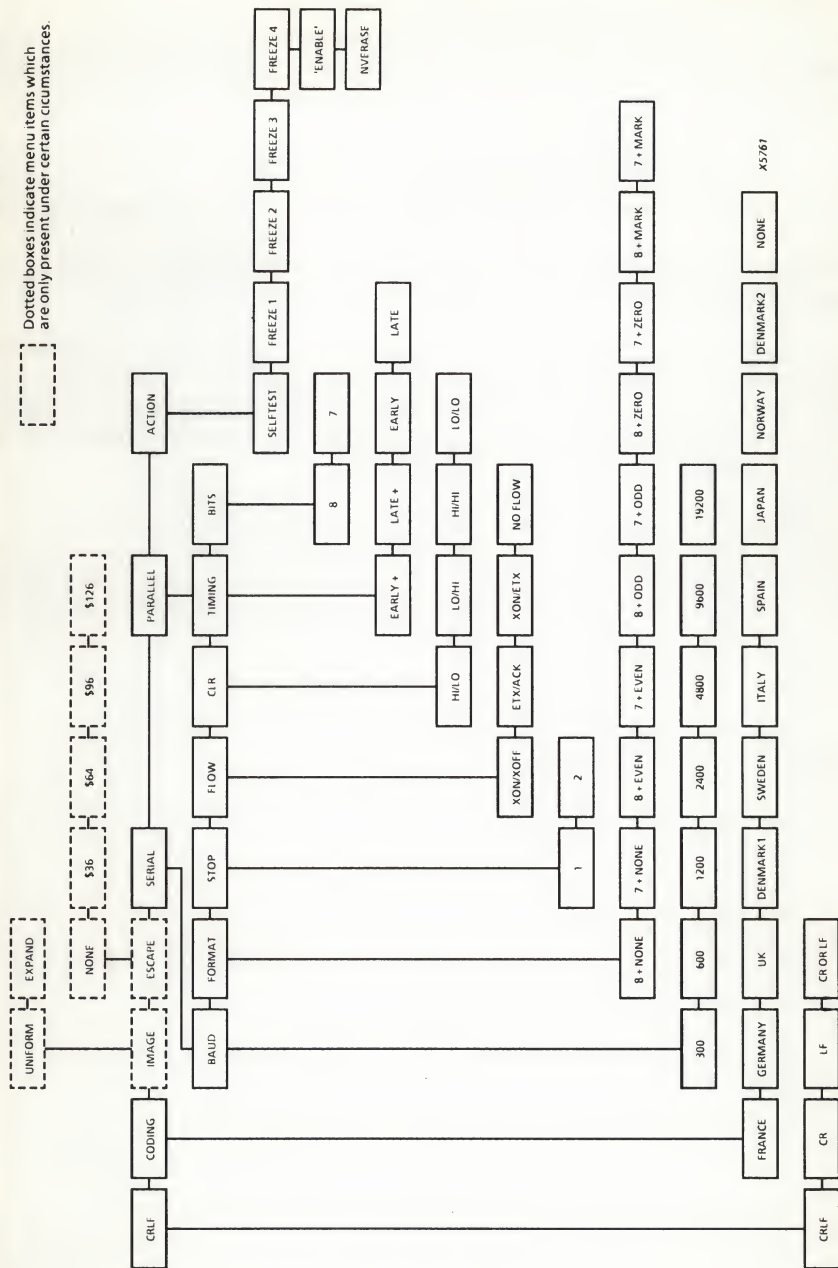
## The Setup Menu

The SETUP menu is used to set the operating parameters of the printer to your exact requirements. It is most likely that you will set up the printer for use with a particular computer and not need to change the parameters of SETUP until the printer is used as part of another system.

Press the ↑ and the SELECT keys together and hold them down for at least one second. The LCD display will now show : \*SETUP\* | crlf

This indicates that you have entered the SETUP menu, and the first item in that menu is crlf. Press the ← or → keys to move through the five items.





## The Select Menu

The SELECT menu is used to set a number of facilities and operating modes on the printer, such as number of copies of each document, emulation mode, font, margin sizes and so on.

There are two ways of using the SETUP menu; you may either make changes to the operating mode of the printer which will last for just one document, or you may change to a new operating mode which must be stored in memory as one of four resident setups.

Next time you switch the printer on, the settings will be taken from the internal settings as decided by the FREEZE 1 option in the SETUP action menu (see above).

To make temporary changes which last for only one document, enter the SELECT menu by pressing the SELECT key, change the setting required for the next document and press the ONLINE key. After the next document has been printed, the last settings will be forgotten and the printer will return to the state it was in before the last set of changes were made.

To make changes which will remain in effect until the printer is switched off and will be stored for later use, enter the SELECT menu by pressing the SELECT key, make the required changes and press the ONLINE key. Now enter the SETUP menu and select FREEZE 1, 2, 3, or 4. The changes will then be stored as one of four resident setups.

1500



## 20.12.4 Installation

For the installation rules, see the Owner's Manual.

Each printer is delivered with an up to data Owner's Manual, use this manual, and keep it with the printer. In rough steps, the installation procedure consists of :

1. Unpacking.
2. Install the Photoconductor drum.
3. Install the Developer unit.
4. Install the Face down stacker and paper trays.
5. Connect power cable.
6. Test the printer via the built-in test.
7. Connect the interface cable.
8. Prepare the printer for use, set it via the SETUP and the SELECT Menu's. The setting of the several items in the SETUP and SELECT Menu's must be in according to the data in the system's printer model and printer interface file.
9. Test the printer via the available system print commands.

## 20.12.5 Maintenance

### Operator Maintenance

Periodic maintenance items for the operator are:

- Oil felt replacement, replaced with toner cartridge
- Cleaning the printer, with replacement of the toner cartridge

**CAUTION:** *When cleaning the printer, and removing spoiled toner, use a vacuum cleaner with an absolute filter.*

### CE Maintenance

The CE maintenance periods depends on printing duty, the routine checking could be:

- Remove following items:
  - Development
  - Cleaner unit
  - Photoconductor drum
  - Fuser
- Clean the inside of the printer, rollers, and area around the Development Unit. See CAUTION above.
- Install the removed items in the reverse order of removal.
- Perform test printing to confirm that no abnormalities exist.



## Error Messages

Check condition messages

The following messages are related to check conditions:

|                                 |                                           |
|---------------------------------|-------------------------------------------|
| * C 1   O u t   o f   P a p e r | Main Cassette is empty                    |
| * C 2   O u t   o f   P a p e r | Input Hopper or 2nd Cassette is empty     |
| * O u t   o f   P a p e r       | Out of Paper in auto-switch               |
| * C 1   L o a d   p a p e r     | Stated paper size is required in C1       |
| * C 2   L o a d   p a p e r     | Stated paper size is required in C2       |
| * L o a d   p a p e r           | Stated paper size is required in C1 or C2 |
| * M A N U A L   p a p e r       | Feed stated paper size in Manual Tray     |
| * C 1   U n l o a d   p a p e r | Stated paper size is wrong size for C1    |
| * C 2   U n l o a d   p a p e r | Stated paper size is wrong size for C2    |
| * P l e a s e   W a i t         | Printer is temporarily non-operational    |
| * P r i n t e r   P a u s e     | Printer electronics malfunction           |
| * T o n e r   E m p t y         | Toner consumables require replacement     |
| * H o p p e r   U n r e a d y   | Input Hopper is not ready for operation   |
| * H o p p e r   O p e n         | Input Hopper cover is open                |
| * S t a c k e r   U n r e a d y | Output Stacker is not ready for operation |
| * S t a c k e r   F u l l       | Output Stacker is full                    |
| * P a p e r   J a m   2         | Paper did not reach Paper Sensor 2        |
| * P a p e r   J a m   3         | Paper did not reach Paper Sensor 3        |
| * P a p e r   J a m   4         | Paper did not reach Paper Sensor 2        |
| * P a p e r   J a m   5         | Paper did not reach Paper Sensor 3        |
| * P a p e r   J a m   6         | Jam in Input Hopper                       |

|                 |                                  |
|-----------------|----------------------------------|
| * Cover open    | Print front cover is open        |
| * Collector out | Toner collector is removed       |
| * Fuser         | Fuser abnormality                |
| * Laser Power   | Laser Power abnormality          |
| * BD Cycle      | Beam Detect Cycle abnormality    |
| * Scan Motor    | Scan Motor abnormality           |
| * Main Motor    | Main Motor abnormality           |
| * Status Error  | Print module status unobtainable |

#### Other messages

The following error messages may be displayed as a result of internal check procedures of the printer. The printer periodically checks the integrity of the font, macro, etc. data held in Read-Only Memory (ROM), Non-Volatile Memory, and Memory Cards. The appearance of one of these messages indicates either an internal malfunction of the printer or an incorrectly fitted ROM or Memory Card.

|       |      |        |                                               |
|-------|------|--------|-----------------------------------------------|
| ROM 1 | Data | Faulty | Resident font data in ROM1 is incorrect       |
| ROM 2 | Data | Faulty | Resident font data in ROM2 is incorrect       |
| ROM 3 | Data | Faulty | Resident font data in ROM3 is incorrect       |
| MC a  | Data | Faulty | Font data in Memory Card A is incorrect       |
| MC b  | Data | Faulty | Font data in Memory Card B is incorrect       |
| MC c  | Data | Faulty | Font data in Memory Card C is incorrect       |
| NRAM  | Data | Faulty | Font data in non-volatile memory is incorrect |

## Trouble Shooting

- Phenomena: i) Too light  
 ii) Too dark  
 iii) Density unquality (vertical)  
 iv) Background smudging  
 v) Offset print

| Items             | Check Point                                                            | Phenomena     | Estimated reason                                     |
|-------------------|------------------------------------------------------------------------|---------------|------------------------------------------------------|
| Cleaning          | Cleaning charge corona has an effect?                                  | iii, iv, v    | If yes: Dirty corona wire                            |
|                   | Cleaning transfer unit has an effect?                                  | i, iii, iv, v | If yes: Dirty transfer unit or transfer charger wire |
|                   | Cleaning transfer unit has an effect?                                  | iii, iv, v    | If yes: Dirty eraser unit                            |
|                   | Cleaning optical unit windowpane has an effect?                        | i, iii        | If yes: Dirty windowpane                             |
|                   | Cleaning surface potential sensor has an effect?                       | i, iv         | If yes: Dust on the sensor                           |
| Consumables Check | Photoconductor drum is used beyond its life time?                      | i, iii, iv, v | If yes: Deterioration of drum characteristics        |
|                   | Developer component is used beyond its life time?                      | i, iv, v      | If yes: Deterioration of developer component         |
|                   | Cylinder is used beyond its life time?                                 | iii, iv, v    | If yes: Degradation of cleaning function             |
|                   | Oil felt is used beyond its life time?                                 | iv, v         | If yes: Degradation of oil supplying function. Dirty |
| Adjustment        | Adjustment of the height of charger position effective?                | iii           | If yes: Improper charger position                    |
|                   | Adjustment of the laser power brings an effect?                        | i, ii         | If yes: Unsuitable toner power (Depends on drum)     |
|                   | Turning the print density potentiometer is effective?                  | i, ii, iv, v  | If yes: Unsuitable toner density level               |
|                   | Adjustment of the position of carrier station brings better condition? | iii           | If yes: Unsuitable carrier station positioning       |
| General Check     | Developer set lever is in correct position?                            | i, iii        | If no: Improper developer unit position              |
|                   | Eraser LED emits light normally?                                       | iv, v         | If no: Faulty LED                                    |
|                   | Ambient condition is within specification?                             | i, ii, iv, v  | If no: Usage in unsuitable condition                 |
| Faulty Parts      | Replacement of drum removes the phenomena?                             | i, iii, iv, v | If yes: Damaged or worn-out drum                     |
|                   | Replacement of developer unit removes the phenomena?                   | i, iv, v      | If yes: Faulty developer unit or worn-out component  |
|                   | Replacement of surface potential sensor removes the phenomena?         | ii, iv, v     | If yes: Faulty sensor                                |
|                   | Replacement of cleaner unit removes the phenomena?                     | iv, v         | If yes: Worn-out furbrush or dirty cleaner unit      |
|                   | Replacement of fuser unit removes the phenomena?                       | v             | If yes: Faulty fuser nit or dirty fuser rollers      |
|                   | Replacement of high voltage power supply removes the phenomena?        | i, iv         | If yes: Faulty power supply                          |
|                   | Replacement of printer module main control PCB removes the phenomena?  | i, iv         | If yes: Faulty printer module main control PCB       |

| Display                                  | Statuses                                                 | Reason                                                                                                                                                                                                          | Condition                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * E2 BD Signal                           | BD cycle abnormality                                     | <ul style="list-style-type: none"> <li>Faulty optical unit</li> <li>Faulty printer module main control PCB</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>BD cycle exceeds the <math>\pm 10\%</math> of nominal value</li> <li>Reset by: Cover open &amp; close</li> </ul>                                                                                                                                                                                                               |
| * E3 Scan Motor                          | Mirror motor abnormality                                 | <ul style="list-style-type: none"> <li>Faulty optical unit</li> <li>Faulty printer module main control PCB</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>The rotation rate of mirror motor exceeds the <math>\pm 5\%</math> of nominal value</li> <li>Reset by: Cover open &amp; close</li> </ul>                                                                                                                                                                                       |
| * E4 Main Motor                          | Main motor abnormality                                   | <ul style="list-style-type: none"> <li>Faulty DC motor</li> <li>Faulty printer module main control PCB</li> </ul>                                                                                               | <ul style="list-style-type: none"> <li>The rotation rate of main motor exceeds the <math>\pm 5\%</math> of nominal value</li> <li>Reset by: Cover open &amp; close</li> </ul>                                                                                                                                                                                         |
| * E0 Fusing                              | Fuser unit abnormality                                   | <ul style="list-style-type: none"> <li>Faulty fuser unit</li> <li>Faulty printer module main control PCB</li> <li>Faulty SSR</li> </ul>                                                                         | <ul style="list-style-type: none"> <li>i) Heat roller does not reach the specified value within 150 sec after power on or cover close</li> <li>ii) Below-150°C or over-230°C is detected</li> <li>Reset by: Cover open &amp; close</li> </ul>                                                                                                                         |
| * Error 11000001<br>10100001<br>10010001 | Faulty interface between the engine and controller board | <ul style="list-style-type: none"> <li>Faulty controller board</li> <li>Faulty mechanical control board</li> <li>Faulty mechanical control cable</li> <li>Loosely connected mechanical control cable</li> </ul> | <ul style="list-style-type: none"> <li>Mechanical control board receives a parity error command.</li> <li>Mechanical control board receives an undefined command.</li> <li>Mechanical control board receives a command for an option that is not connected.</li> <li>Mechanical control board receives an illegal command during mechanical test printing.</li> </ul> |



## Other Print Problems

| No. | Error                                         | Cause                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | LCD doesn't display                           | <p>The cause depends on whether the POWER LED on the operator panel is lit or off, as follows:</p> <p>[OFF]</p> <ul style="list-style-type: none"> <li>• Power failure due to power supply error</li> <li>• Operator panel cable disconnected</li> <li>• Controller board unit power supply ( + 5V) cable disconnected</li> </ul> <p>[ON]</p> <ul style="list-style-type: none"> <li>• Fault in operator/panel</li> <li>• Fault in operator panel cable connector</li> <li>• Fault in controller board unit</li> </ul> |
| 2   | Keys on the operator panel do not function    | <ul style="list-style-type: none"> <li>• Faulty operator panel</li> <li>• Faulty controller board</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3   | RS-232C interface error                       | <ul style="list-style-type: none"> <li>• Jumper pin of controller board unit RS-232C/RS-422 inserted incorrectly or disconnected</li> <li>• Fault in RS-232C cable (inter- or intra-cabinet) or connector</li> <li>• Incorrect baud rate (due to incorrect setting on operator panel)</li> <li>• Incorrect protocol (due to incorrect setting on operator panel)</li> <li>• Fault in controller board unit</li> </ul>                                                                                                  |
| 4   | Centronics interface error.                   | <ul style="list-style-type: none"> <li>• Fault in centronics interface cable (intra- or inter-cabinet) or connector/fuser unit</li> <li>• Fault in controller board unit</li> </ul>                                                                                                                                                                                                                                                                                                                                    |
| 5   | Printed characters are all white or all black | <p>The cause depends on the results of a test print performed by the test print switch</p> <p>[If printing is normal]</p> <ul style="list-style-type: none"> <li>• Fault in controller board unit</li> <li>• Fault in video interface cable or connector</li> </ul> <p>[If printing is abnormal]</p> <ul style="list-style-type: none"> <li>• Engine inside inspection is necessary</li> </ul>                                                                                                                         |



## 21 VISUAL DISPLAY UNITS

Section:

Page:

|                   |        |
|-------------------|--------|
| 1: Technical Data | 21.1.1 |
|-------------------|--------|

|                           |        |        |        |        |         |
|---------------------------|--------|--------|--------|--------|---------|
| 2: FT45 Old model         | 21.2.1 | 21.2-2 | 21.2-3 | 21.2-6 | 21.2-12 |
| 3: FT45 New model         | 21.3-1 | 21.3-2 | 21.3-3 | 21.3-4 | 21.3-10 |
| 4: TM220                  | 21.4-1 | 21.4-2 | 21.4-3 | 21.4-4 | 21.4-8  |
| 5: M4305 Microvitec       | 21.5-1 | 21.5-2 | 21.5-3 | 21.5-6 | 21.5-8  |
| 6: P2701 C-ITOH CIT-324   | 21.6-1 | 21.6-2 | 21.6-3 | 21.6-5 | 21.6-6  |
| 7: P2702 C-ITOH CIT-324 + | 21.7-1 | 21.7-2 | 21.7-3 | 21.7-5 | 21.7-6  |
| 8: P2707 Wyse WY-120      | 21.8-1 | 21.8-2 | 21.8-3 | 21.8-5 | 21.8-6  |
| 9: DEC VT420              | 21.9-1 | 21.9-2 | 21.9-3 | 21.9-4 | 21.9-5  |

Subsection:

|   |                 |       |   |
|---|-----------------|-------|---|
| 1 | Characteristics | _____ | ↑ |
| 2 | Connections     | _____ | ↑ |
| 3 | Strap Settings  | _____ | ↑ |
| 4 | Installation    | _____ | ↑ |
| 5 | Maintenance     | _____ | ↑ |

**NOTE:** *n.a. means that this section is not available for this unit.*





## 21.1 TECHNICAL DATA

|                                     | <b>FT45<br/>Old model</b>     | <b>FT45<br/>New model</b>     | <b>TM220</b>                  | <b>M4305<br/>Microvitec</b>   |
|-------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Screen size                         | 14"                           | 14"                           | 14"                           | 14"                           |
| Screen capacity                     | 24 rows,<br>81 columns        | 24 rows,<br>81 columns        | 24 rows,<br>80 / 132 columns  | 30 rows,<br>80 / 132 columns  |
| Graphic resolution                  | --                            | --                            | --                            | 480 X 360                     |
| Screen colour<br>Green              | FT 45 A                       | FT 45 A                       | TM 220                        | --                            |
| Screen colour<br>Amber              | FT 45 B                       | FT 45 B                       | TM 220 A                      | --                            |
| Number of colours                   | --                            | --                            | --                            | 16 from palette<br>of 4096    |
| Screen Refresh                      | 53,9 Hz                       | 53,9 Hz                       | Soft strapped                 |                               |
| Soft strapping using<br>Set-Up mode | No                            | No                            | Yes                           | Yes                           |
| Built in test                       | Yes                           | Yes                           | Yes                           | Yes                           |
| Including Keyboard                  | Yes                           | Yes                           | Yes                           | Yes                           |
| Optional Interface                  | RS423/RS422                   | RS423/RS422                   | RS422                         | --                            |
| Auxiliary interface                 | Yes<br>port A or<br>port B    | Yes<br>port A or<br>port B    | Yes                           | Yes<br>RS232,<br>Centronics   |
| Interface<br>transmission speed     | Hardware<br>strapped          | Hardware<br>strapped          | Soft strapped                 | Soft strapped                 |
| Interface<br>transmission mode      | Async,<br>Full duplex         | Async,<br>Full duplex         | Async,<br>Full duplex         | Async,<br>Full duplex         |
| Line procedure                      |                               |                               | XON / XOFF                    | XON / XOFF<br>and<br>DTR/CTS  |
| Power supply built in               | Yes                           | Yes                           | Yes                           | Yes                           |
| Mains range<br>selectable           | Yes<br>115 or 230 V           | Yes<br>115 or 230 V           | Yes<br>115 or 230 V           | No                            |
| Remarks                             | End<br>Commercial<br>Delivery | End<br>Commercial<br>Delivery | End<br>Commercial<br>Delivery | End<br>Commercial<br>Delivery |

|                                     | <b>P2701<br/>(CIT-324)</b>    | <b>P2702<br/>(CIT-324 + )</b> | <b>P2707<br/>(WY-120)</b>                          | <b>VT420</b>                          |
|-------------------------------------|-------------------------------|-------------------------------|----------------------------------------------------|---------------------------------------|
| Screen size                         | 14"                           | 14"                           | 14"                                                | 14"                                   |
| Screen capacity                     | 24 rows,<br>80/132 columns    | 24 rows,<br>80/132 columns    | 26 rows,<br>80 / 132 columns                       | 24,36,48 rows,<br>80 / 132 columns    |
| Graphic resolution                  | --                            | --                            | --                                                 | --                                    |
| Screen colour<br>White              | P2701-001                     | P2702-001                     | P2707-001                                          | VT420-Ax                              |
| Screen colour<br>Green              | P2701-002                     | --                            | P2702-002                                          | VT420-Bx                              |
| Screen colour<br>Amber              | P2701-003                     | --                            | P2707-003                                          | VT420-Cx                              |
| Number of colours                   | --                            | --                            | --                                                 | --                                    |
| Screen Refresh                      | 71 Hz                         | 71 Hz                         | 78 Hz                                              | 70 Hz                                 |
| Soft strapping using<br>Set-Up mode | Yes                           | Yes                           | Yes                                                | Yes                                   |
| Built in test                       | Yes                           | Yes                           | Yes                                                | Yes                                   |
| Including Keyboard                  | Yes                           | Yes                           | Yes                                                | Yes                                   |
| Optional Interface                  | RS423                         | RS423                         | no                                                 | DEC423                                |
| Auxiliary interface                 | Yes<br>RS232C                 | Yes<br>RS232C                 | Yes<br>Centronics<br>parallel                      | Yes<br>DEC423                         |
| Interface<br>transmission speed     | Soft strapped                 | Soft strapped                 | Soft strapped                                      | Soft strapped                         |
| Interface<br>transmission mode      | Async,<br>Full duplex         | Async,<br>Full duplex         | Async,<br>Full duplex                              | Async,<br>Full duplex                 |
| Line procedure<br>(Buffer control)  | XON / XOFF<br>or<br>DTS / DTR | XON / XOFF<br>or<br>DTS / DTR | XON / XOFF<br>DTS / DTR<br>DTR / XOFF<br>or<br>XPC | XON / XOFF<br>DTS / DTR<br>DTR / XOFF |
| Power Supply built in               | Yes                           | Yes                           | Yes                                                | Yes                                   |
| Mains range<br>selectable           | Yes<br>135 or 270 V           | Yes<br>135 or 270 V           | no<br>different PCB's                              | Yes<br>120V to 240V                   |
| Remarks                             | Partial overscan              | Full overscan                 | Full overscan<br>End<br>Commercial<br>Delivery     | Full overscan                         |

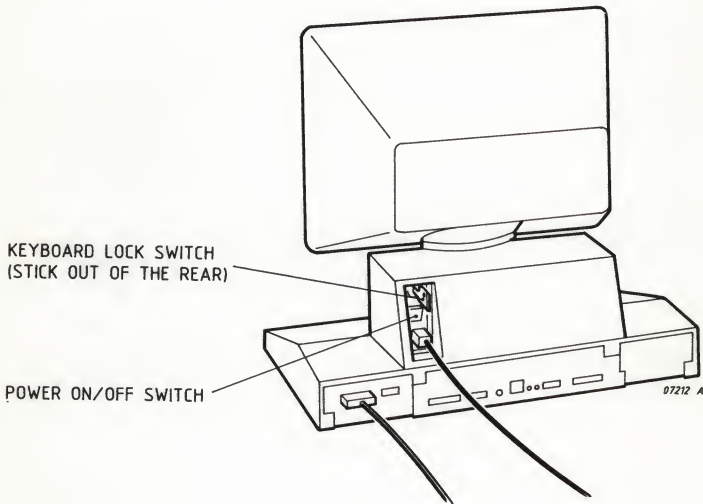
## 21.2 FT 45 Old model

The FT45 is End Commercial Delivery.

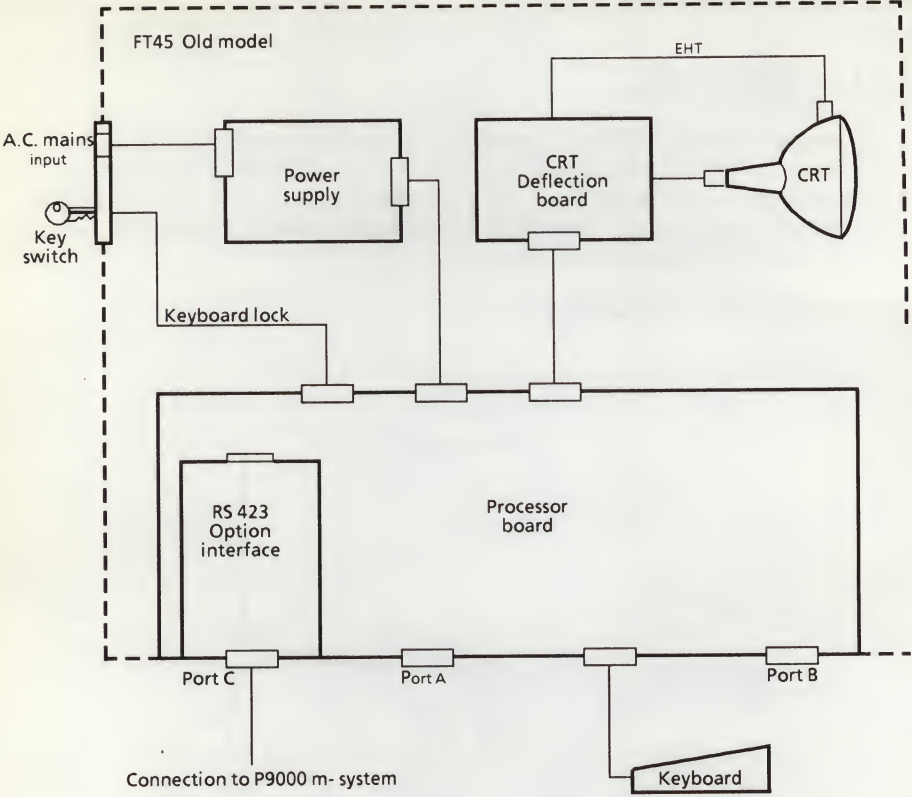
### 21.2.1 Characteristics

The picture below shows how this terminal can be recognised from the outside. With exception of the brightness potentiometer, the optional RS423 / RS 422 interface, and the keyboard, no internal items of this terminal can be used in the FT45 new model. However items of the new model FT45 can be installed in the old model using special designed installation kits.

For the technical data, see section 21.1.



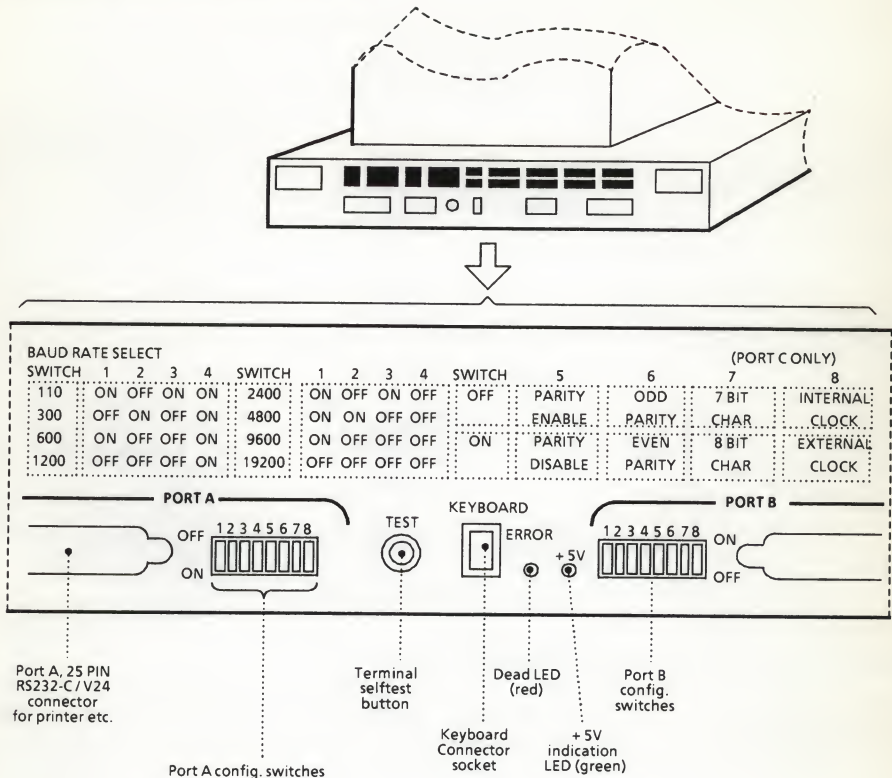
21.2.2 Connections





## 21.2.3 Strap Settings

### Processor pcb, port A and port B



| Baud rate    | Switch settings |            |            |            |
|--------------|-----------------|------------|------------|------------|
|              | 1               | 2          | 3          | 4          |
| .110         | On              | Off        | On         | On         |
| .300         | Off             | On         | Off        | On         |
| .600         | On              | Off        | Off        | On         |
| 1.200        | Off             | Off        | Off        | On         |
| 2.400        | On              | Off        | On         | Off        |
| 4.800        | On              | On         | Off        | Off        |
| 7.200        | Off             | Off        | On         | Off        |
| <b>9.600</b> | <b>On</b>       | <b>Off</b> | <b>Off</b> | <b>Off</b> |
| 19.200       | Off             | Off        | Off        | Off        |

Switch 5 : On Parity disabled  
 Switch 6 : N.A.  
 Switch 7 : On 8 bit  
 Switch 8 : Off Internal clock

## Option port C

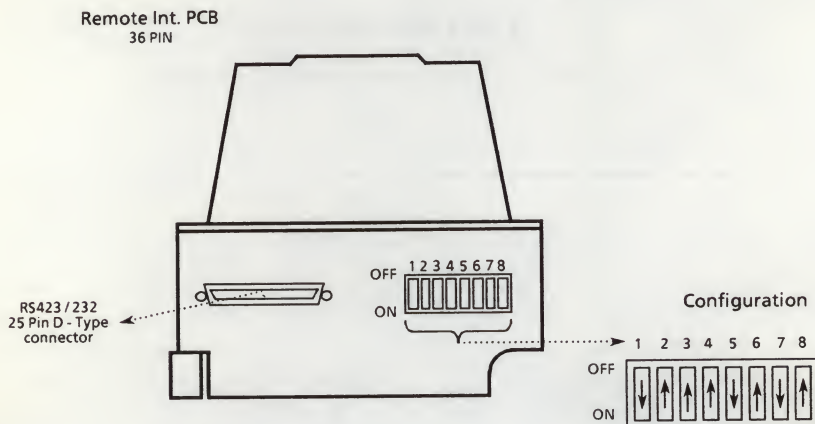
Use setting for S2000/S6000 host. Switch setting BAUD rate is the same as for port A, and or port B on the processor pcb. The ON/OFF text is screened up-side down on the rear panel of the option for the switches 5, 6, 7 and 8.

Default for the P9000 m-system is: Switch 5, parity disable (ON)

Switch 6, not applicable

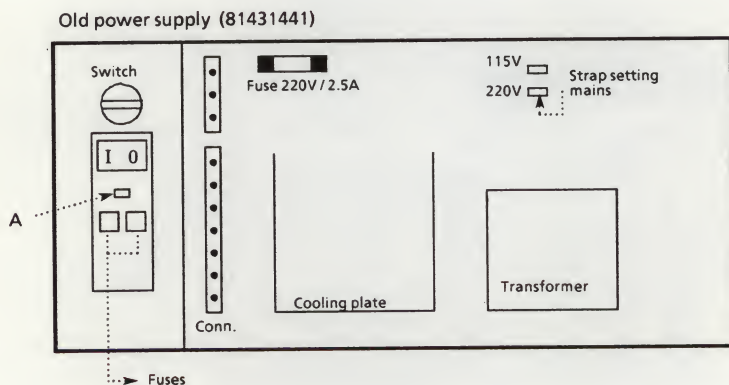
Switch 7, 8 bits per character (ON)

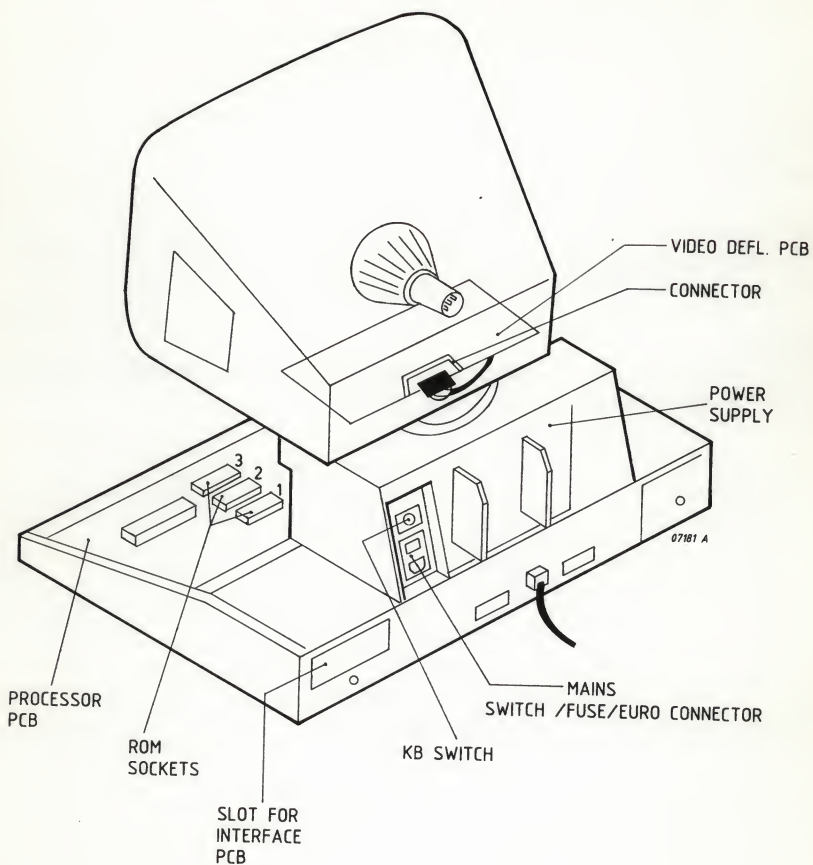
Switch 8, internal clock for local use (OFF)



## Power Supply Mains Voltage Range and Fuses

To reach the two fuses (1.6 A slow blow) remove the fuseholdercover plate, using a small blade screwdriver. Put the screwdriver in the hole at position A and pull the cover plate forward. The fuseholder can now easily be removed.





## 21.2.4 Installation

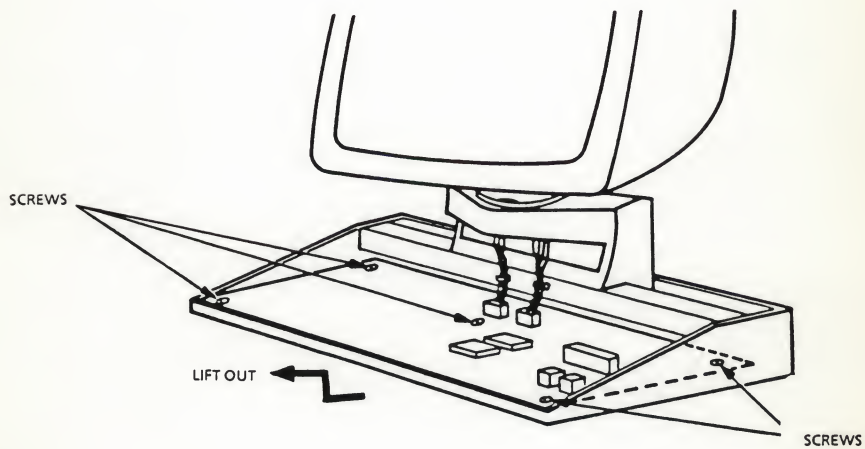
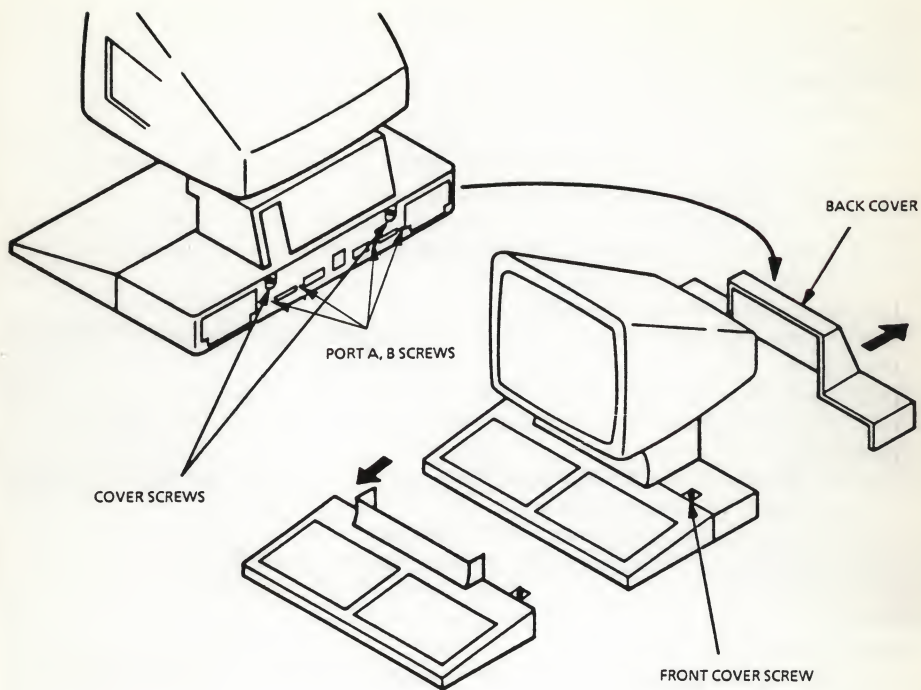
### Removal Processor pcb.

- Switch off and disconnect the mains cable, disconnect the data connection with the system and also disconnect the key-board.
- Remove the option pcb RS423 / RS422 and the dummy plate at the right side.
- Remove first the rear cover (remove two screws) and then the front cover (two screws or bolts).
- Remove the shielding plate at the front, three screws or bolts at the front and one at each side.
- Remove the four screws that connect the port A and B connector to the rear chassis plate.
- Loosen the four screws that fix the processor board to the bottom plate.
- Disconnect the power supply DC cable, and the cable to the CRT driver board.
- Lift the pcb up at the front side and remove it, see figure.

### Replacement

- Follow the above described procedure in the reverse order to reinstall the processor pcb. Prior to doing this check the PROM levels.



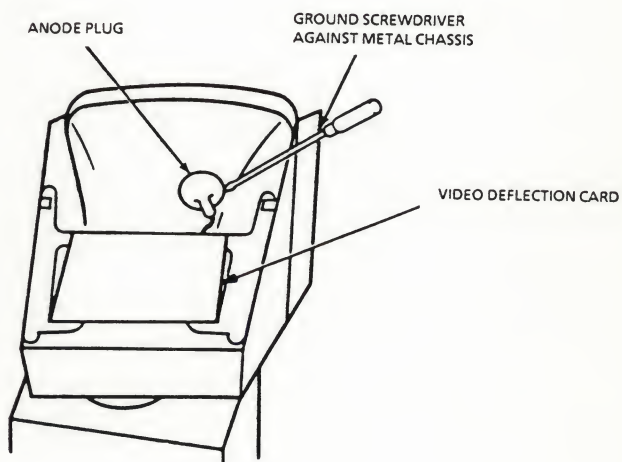
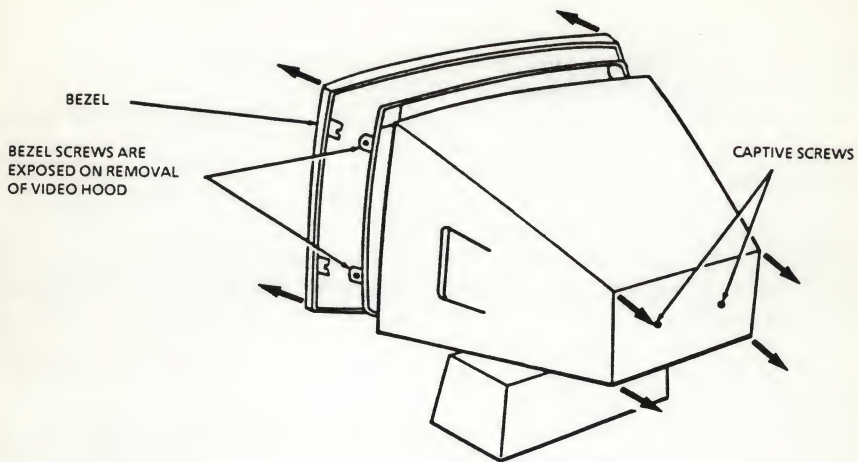


### **Removal Deflection pcb.and the Tube Assembly**

- Switch off and disconnect the mains cable.
- Remove the two captive screw that hold the video hood at the rear and slide the hood backwards to remove it.
- Loosen the bezel screws, two at each side, and remove the bezel.
- Remove the shielding plate at the top, three screws in total.
- Discharge the CRT tube and the anode supply wire.
  - Wait at least three minutes after power off before discharging the anode line.
    - Use a screwdriver with an insulated handgrip.
    - Connect the screwdriver to the grounded chassis.
    - Slide the flat side of the screwdriver gently under the anode fly-back pad and discharge the anode line.
- Disconnect the anode wire from the tube.
- Remove the small cover at the rear (one bolt) and disconnect the cable to the CRT driver pcb.
- Disconnect the the wires to the deflection coils, note down there colour, and disconnect the video tube. See also the coloured dots on the deflection coil assembly.
- Remove the two screws at each side that fix the tube assembly to the chassis of the terminal. Gently remove the tube assembly.
- Remove the two screws that fix the CRT driver pcb.
- Remove the pcb and take care not to damage the two plastic quick fittings.

### **Replacement**

- This can be done by following most of the above described procedure in the reverse order.



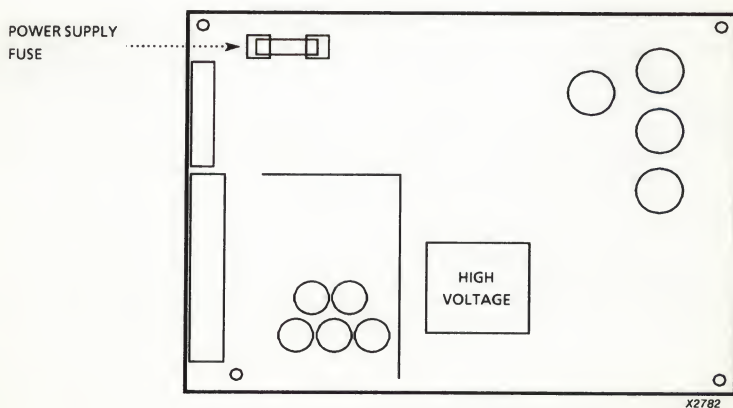
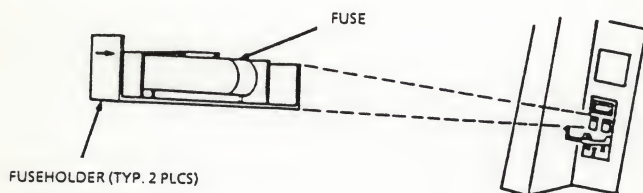
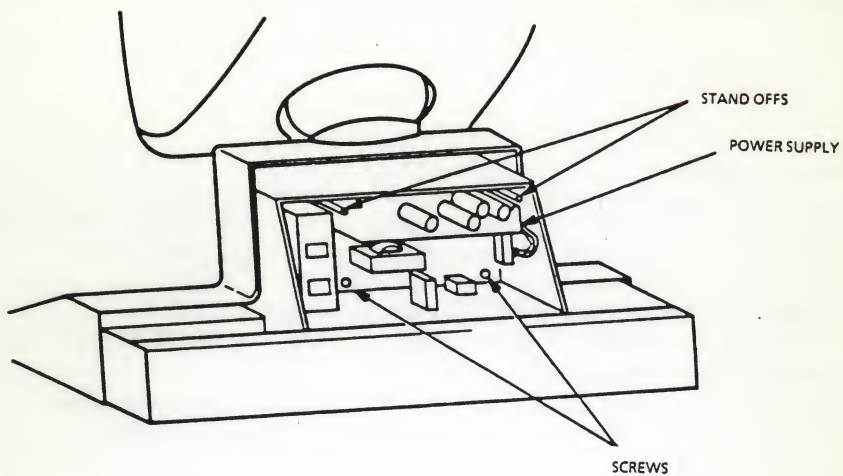
### **Removal Power Supply and Key-switch/AC connection Assembly**

- Disconnect the mains cable after switching off the mains.
- Remove the option pcb and the cover plate at the right side, one screw each.
- Remove the rear bottom cover.
- Remove the PSU shielding cover, remove one bolt at the right side and press the cover at the top, move it backwards and lift it off.
- Remove also the front bottom cover, only needed if the key-switch has to be exchanged. Disconnect the cable to the key-switch.
- Disconnect the AC connector (top) on the PSU pcb.
- Remove two screws that fix the assembly to the chassis.
- Turn the topside of the assembly to the back and lift it off.
- Disconnect the DC low voltage cable (bottom) on the PSU pcb.
- In each corner of the pcb there is a crosshead screw that must be removed, after this is done the PSU pcb can be removed.

### **Replacement**

- Replacement can be done by following the above described procedure in the reverse order. Check the mains strap setting before connecting the mains cable and closing the terminal housing.





## 21.2.5 Maintenance

### Test and Diagnostics

The terminal has two diagnostic functions :

- Power-up diagnostic,
- Test button diagnostic.

### Power-up diagnostic

- Every time the terminal is switched on, these diagnostics verify that the unit is at least minimally functional. Test codes appear on the screen as the terminal cycles through the power-on tests. If a test fails, the current test code "freezes" on the screen, and the error LED at the rear stays on.

Example, if no pcb installed at port C the test stops with test code 59.

If no keyboard is installed the test is running in a loop, indicating at the bottom of the screen that there is no keyboard and the test is started again.

| CODE | TEST                                                                                                                            | POSSIBLE FAILURE                                                     |
|------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| *    | CPU Test                                                                                                                        | Z80 CPU<br>System Clock<br>Data or Address Bus                       |
| 11   | Verify DRAM for stack use.                                                                                                      | Data bus to RAM<br>Bad RAM chip<br>Address bus<br>Memory map decoder |
| 12   | Verify CALL/RET instruction                                                                                                     | Z80 CPU                                                              |
| 13   | Verify ROM 0 checksum (0000-1FFF)                                                                                               | Bad ROM 0 (diagnostic ROM)                                           |
| 14   | Verify ROM 0 checksum (0000-1FFF)                                                                                               | Bad ROM 0 (firmware ROM)                                             |
| 1A   | Test for no parity error by setting even parity, writing 55 to memory and reading back the memory, expecting a parity bit of 0. | Parity circuitry                                                     |
| 1B   | Test for expected parity error after setting odd parity and reading the memory.                                                 | Parity circuitry                                                     |
| 1C   | Test for no parity error by setting even parity, writing 55 to memory and reading back the memory, expecting a parity bit of 0. | Parity circuitry<br>Parity reset circuitry I/O port decoding PAL     |
| 1D   | Test for expected parity error interrupt after setting odd parity and reading memory.                                           | Parity circuitry                                                     |

| CODE | TEST                                                                                                                           | POSSIBLE FAILURE                                                                                  |
|------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| 1E   | Test for no parity error by setting odd parity, writing 8 to memory and reading back the memory, expecting a parity bit of 0.  | Parity circuitry                                                                                  |
| 1F   | Test for expected parity error interrupt after setting even parity and reading memory.                                         | Parity circuitry                                                                                  |
| 20   | Test for no parity error by setting odd parity, writing C3 to memory and reading back the memory, expecting a parity bit of 1. | Parity circuitry                                                                                  |
| 21   | Test for expected parity error interrupt after setting even parity and reading memory.                                         | Parity circuitry                                                                                  |
| 22   | Short attribute VRAM test (5/A complete pattern).                                                                              | Bad static RAM chip<br>VRAM buffers<br>VRAM MUX logic (row/Column)<br>VRAM controller logic (PAL) |
| 23   | Short character VRAM test (55/AA complete pattern).                                                                            | Bad static RAM chip<br>VRAM buffers<br>VRAM MUX logic (row/Column)<br>VRAM controller logic (PAL) |
| 24   | DRAM and parity RAM addressing test (modulo 3 pattern).                                                                        | Address bus to RAM<br>DRAM chip<br>Parity DRAM chip<br>DRAM read/write circuitry                  |
| 25   | Read all data patterns under odd parity, verify no parity errors occur.                                                        | Parity circuitry                                                                                  |
| 26   | Read under even parity all data patterns written under even parity, verify parity errors occur.                                | Parity circuitry                                                                                  |
| 27   | Read all data patterns under even parity verify no parity errors occurs.                                                       | Parity circuitry                                                                                  |
| 28   | Read under even parity all data patterns written under even parity, verify parity errors occur.                                | Parity circuitry                                                                                  |
| 29   | Verify the lower 16K of DRAM.                                                                                                  | Address bus to DRAM<br>DRAM chip<br>Parity chip<br>RAM/ROM mapping PROM                           |
| 2A   | Verify the upper 8K of DRAM (E000-FFFF).                                                                                       | Address bus to DRAM<br>DRAM chip<br>Parity chip<br>RAM/ROM mapping PROM                           |

| CODE | TEST                                                                                                                                 | POSSIBLE FAILURE                                                                                                                                                                                                               |
|------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31   | Test Z80 DMA memory to memory transfer with end of block interrupt, using "55" blocks. Also tests for parity errors in DMA transfer. | Z80 DMA<br>Timing problems between DMA and parity generator Interrupt circuitry.                                                                                                                                               |
| 32   | Test Z80 DMA memory to memory transfer with end of block interrupt, using "AA" blocks. Also tests for parity errors in DMA transfer. | Z80 DMA<br>Timing problems between DMA and parity generator Interrupt circuitry.                                                                                                                                               |
| 41   | Verify data lines to counter/timer clock (CTC).                                                                                      | Data lines to CTC<br>CTC control lines<br>CTC chip                                                                                                                                                                             |
| 42   | Verify CTC channel by loading TC with the channel number                                                                             | CTC control<br>CTC chip                                                                                                                                                                                                        |
| 43   | Verify CTC interrupt on TC = 0 for channel 0.                                                                                        | CTC chip                                                                                                                                                                                                                       |
| 44   | Verify CTC interrupt on TC = 0 for channel 1.                                                                                        | CTC chip                                                                                                                                                                                                                       |
| 45   | Verify CTC interrupt on TC = 0 for channel 2.                                                                                        | CTC chip                                                                                                                                                                                                                       |
| 46   | Verify CTC interrupt on TC = 0 for channel 3.                                                                                        | CTC chip                                                                                                                                                                                                                       |
| 51   | Verify data lines to SIO.                                                                                                            | Data bus to SIO<br>SIO control lines<br>SIO chip                                                                                                                                                                               |
| 52   | Verify CSIO error checking by forcing a receiver overrun.                                                                            | SIO chip<br>74LS157 MUX for loopback MUX enable line                                                                                                                                                                           |
| 53   | Verify keyboard loopback by polling.                                                                                                 | SIO chip, channel B<br>SIO control lines<br>74LS157 MUX for loopback MUX enable line                                                                                                                                           |
| 54   | Verifies encoded loopback, sensing three characters. Will fail if the test is run in SDLC mode.                                      | SIO chip, channel A. BIPED chip<br>SIO control lines<br>Switch 1,1 set for LC<br>LVC/SDLCX distinction logic<br>BIPED control lines, buffers and logic between SIO and BIPED.<br>Handshaking between SIO and DMA (ready line). |
| 55   | Verify data lines to DS-40 card (if present).                                                                                        | Data bus to DS-40 card SIO<br>DS-40 control lines<br>DS-40 SIO chip                                                                                                                                                            |
| 56   | Force receiver overrun to verify DS-40 error checking.                                                                               | SIO chip<br>74LS157 MUX for loopback MUX enable line                                                                                                                                                                           |



| CODE | TEST                                                                                 | POSSIBLE FAILURE                                                                     |
|------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 57   | Verifies DS-40 Port A serial loopback.                                               | SIO chip, channel A<br>SIO control lines<br>74LS157 MUX for loopback MUX enable line |
| 58   | Verifies DS-40 Port B serial loopback.                                               | SIO chip, channel B<br>SIO control lines<br>74LS157 MUX for loopback MUX enable line |
| 59   | If the TM40 FT45 has an asynchronous backpanel, verifies asynch loopback.            | SIO chip, channel A<br>SIO control lines<br>74LS157 MUX for loopback MUX enable line |
| 5A   | Verifies KSIO interrupt on first receive character.                                  | SIO chip<br>Interrupt line (unlikely).                                               |
| 5B   | Verifies DS-40 SIO channel A first character interrupt (if DS-40 card is installed). | DS-40 SIO chip<br>Associated control lines                                           |
| 5C   | Verifies DS-40 SIO channel B first character interrupt (if DS-40 card is installed). | DS-40 SIO chip<br>Associated control lines                                           |
| 5F   | All automatic tests successfully completed.                                          |                                                                                      |

## Test button diagnostic

- When the Test button at the rear is depressed the following screen is shown.
- The text on the screen explains it self, you can select one of the tests in the range 0 to 8 and you can check your configuration, see the bottom part of the screen.

```

* MANUAL TESTS, RESET ABORTS ANY TEST TM-40/FT45 REV X ROM
*
* 0 - ASYNC TERMINAL AT PORT A
* 1 - ASYNC TERMINAL AT PORT B
* 2 - RUN OPTION BOARD ON BOARD ROM DIAGNOSTICS
* 3 - POLLING ADDRESS TEST
* 4 - CABLE LOOPBACK TEST
* 5 - CG / KEYBOARD TEST
* 6 - DOWNLOAD
* 7 - DEAD LED TEST (TERMINAL PROCESSOR)
* 8 - RUN POWER - UP DIAGNOSTICS
*
* CHARACTER ATTRIBUTES
* THE FOLLOWING SHOULD BE BLACK INTENSIFIED BLINKING
*
* EEE
* HHH
*
* DS - 40 (IS / IS NOT) INSTALLED
* OPTION BBOARD (IS / IS NOT) INSTALLED
* PORT C IS (COAXIAL / RS - 423 / OR RS - 422 4S)
* KEYBOARD SWITCH STATUS = (LOCKED / UNLOCKED)
* TERMINAL REVISION = XX

```

X2328

## Maintenance Trouble Shooting Guide

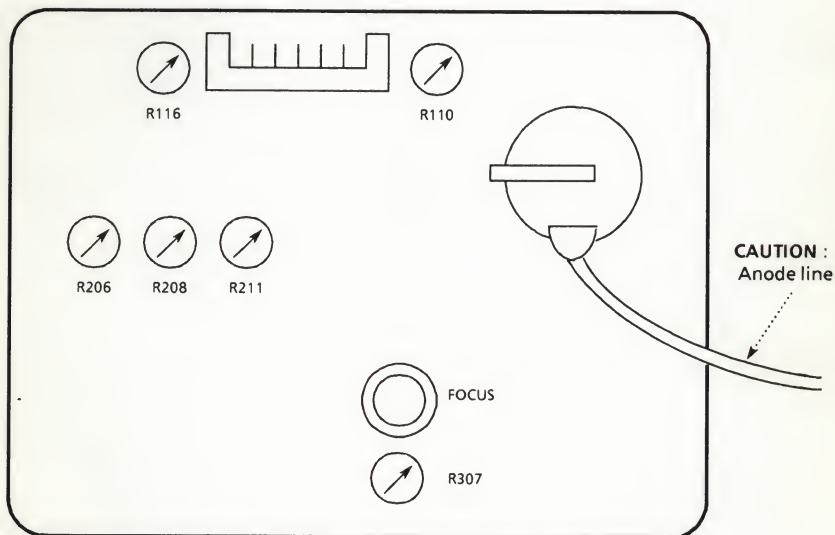
| PROBLEM                                                                                                                    | POSSIBLE CAUSE / SOLUTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The video display unit is making short, shrill chirping sound. Operation is erratic.                                       | Bad power supply. Check the power supply voltages. If variant, replace the power supply unit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| No display appears on the screen although workstation power is on.                                                         | <ol style="list-style-type: none"> <li>1. Adjust the brightness knob at the front.</li> <li>2. Adjust the brightness control potentiometer on the CRT driver board.</li> <li>3. Check the cable connection to the CRT and the CRT driver board to make sure they are properly attached.</li> <li>4. Other causes can be a blown fuse or no high voltage. Check the CRT by switching the terminal off and check the screen for a bright dot, indicating high voltage is present.</li> <li>5. If high voltage is present, and the fuse seems all right, check to see if the red error LED on the rear panel is on. Run the unit through the power on diagnostics to see if an error occurs. Possible causes could be (in order of likelihood) : <ul style="list-style-type: none"> <li>- 12 Kvolt not delivered to the CRT</li> <li>- Bad cathode driver board</li> <li>- Bad processor card</li> <li>- Bad deflection board</li> <li>- Bad CRT</li> </ul> </li> <li>6. If the green pilot indicator on the backpanel does not light, check the fuse inside the power supply.</li> </ol> |
| No characters appear on the video screen. The unit generates excessive heat and exhibits spark gaps                        | <ol style="list-style-type: none"> <li>1. Check for a bad CRT.</li> <li>2. Inspect the video deflection card to make sure no burnt components are present.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| The CRT screen remains dark. The fault indicator LED is off, no heat is generated, and the unit seems to be without power. | <p>The unit is not receiving power.</p> <ol style="list-style-type: none"> <li>1. Check the power cord to make sure the unit is receiving AC power. First, verify that the power cord is securely plugged in.</li> <li>2. If the cord is firmly connected, the fuse on the backpanel may be blown. Check the fuse (two are present).</li> <li>3. Also check the power supply voltages. If the power supply is not at proper power, the problem may be a blown powersupply fuse or a bad power supply. Check the power supply fuse before suspecting a faulty power supply.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Screen display is off-center or tilted.                                                                                    | The video display is out of adjustment. Readjust the display.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| PROBLEM                                                                                                       | POSSIBLE CAUSE / SOLUTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pressing the keyboard keys generates wrong or spurious characters, or characters do not appear on the screen. | <ol style="list-style-type: none"> <li>1. First check the keyboard connector to make sure the keyboard cable is properly connected.</li> <li>2. If the cable is all right, a bad keyboard is the probable cause : <ul style="list-style-type: none"> <li>- Run the "keyboard test" diagnostic and check to see if the proper characters are generated.</li> <li>- If the keyboard test fails first check for a bad keyboard connection.</li> <li>- Check for contamination on the keyboard and if present clean it.</li> <li>- If no contamination ,diagnostic test is failing and the red LED indicator is on, the cause could be (in order of likelihood) : <ul style="list-style-type: none"> <li>- Defective keyboard</li> <li>- Bad backpanel interface card</li> <li>- Bad processor card</li> </ul> </li> </ul> </li> </ol> |
| Wrong character attribute appears on the screen                                                               | The character generator is faulty.<br>Replace the terminal processor card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Screen display drops a line.                                                                                  | A communication error is at fault. <ol style="list-style-type: none"> <li>1. Check the video cable, to make sure it is properly connected.</li> <li>2. If the unit has a coaxial interface, the problem may be in the terminal processor card and or the interface adaptor card.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| The terminal functions erratically.                                                                           | <ol style="list-style-type: none"> <li>1. A loose-socketed ROM may be at fault. Inspect the processor card for loose chips.</li> <li>2. Improperly soldered connections may be at fault. Check for bad connections on the processor card.</li> <li>3. If connections are good, run the power-on and manual diagnostic tests to isolate the problem.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



# Adjustments CRT driver board

| POTENTIOMETER | FUNCTION           |
|---------------|--------------------|
| R 110         | Brightness         |
| R 116         | Contrast           |
| R 206         | Vertical Hold      |
| R 208         | Vertical Size      |
| R 211         | Vertical Linearity |
| R 307         | Horizontal Center  |
| -             | Focus              |





## 21.3 FT45 New model

The FT45 New model is End Commercial delivery

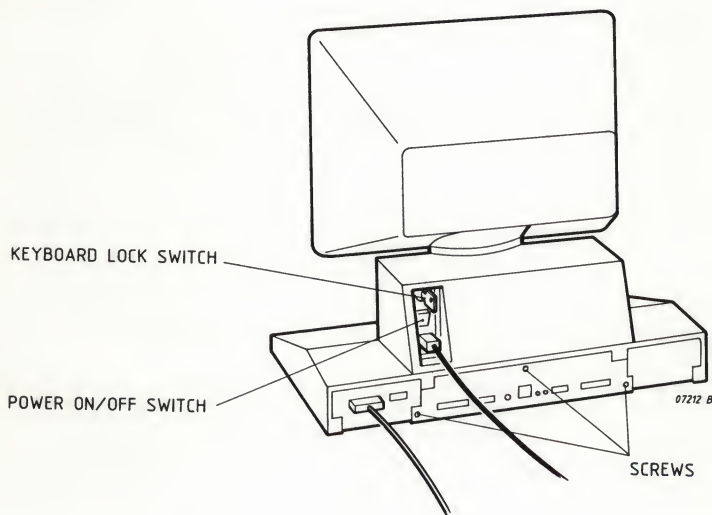
### 21.3.1 Characteristics

The picture below shows how this terminal can be recognised from the outside.

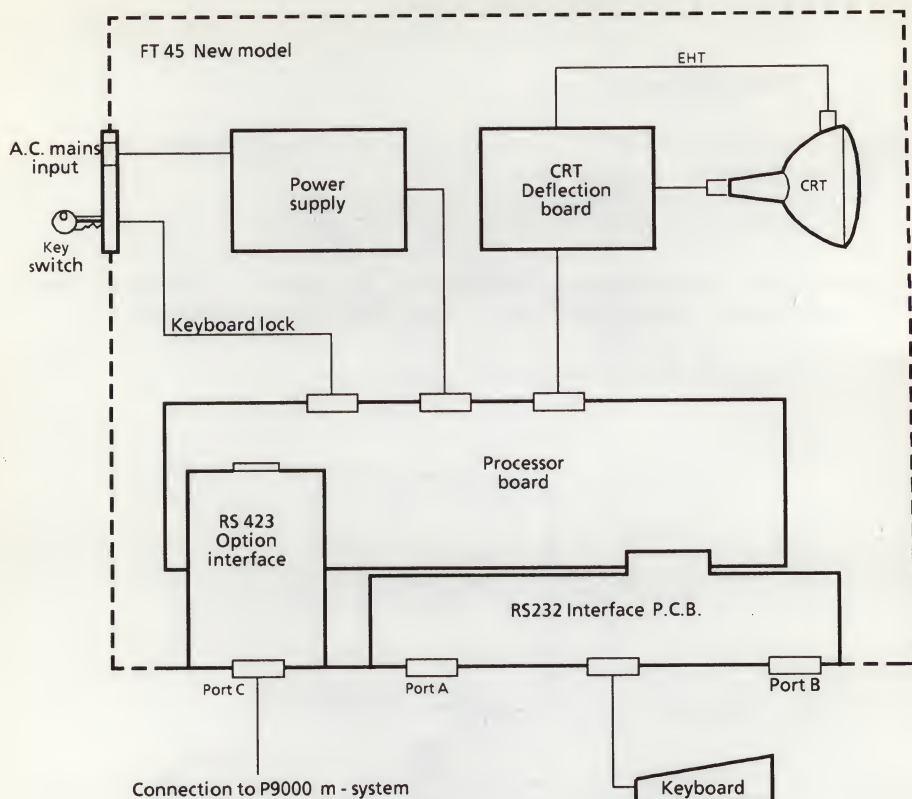
- The key switch does not stick out at the rear.
- The key can be taken out in the unlock keyboard position.
- The rearpanel of port A and B is no part of the chassis.

With the exception of the brightness potentiometer, the optional RS423/RS422 interface and the keyboard, no parts of the FT45 old model can be used in this terminal.

For the technical data, see section 21.1.



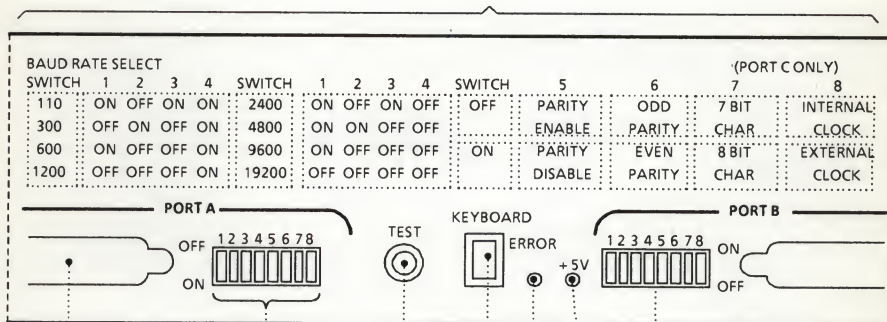
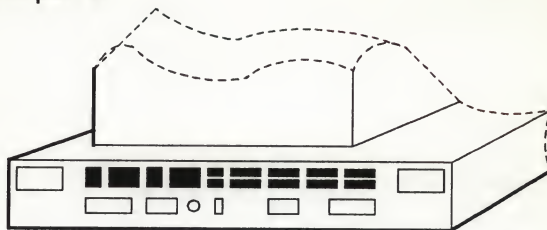
## 21.3.2 Connections





## 21.3.3 Strap Settings

Processor pcb, port A and port B.



Port A, 25 PIN  
RS232-C/V24  
connector for printer etc.

Port A config. switches

Terminal  
selftest  
button

Keyboard  
connector  
socket

Dead LED  
(red)

+5V  
Indication  
LED (green)

Port B  
config.  
switches



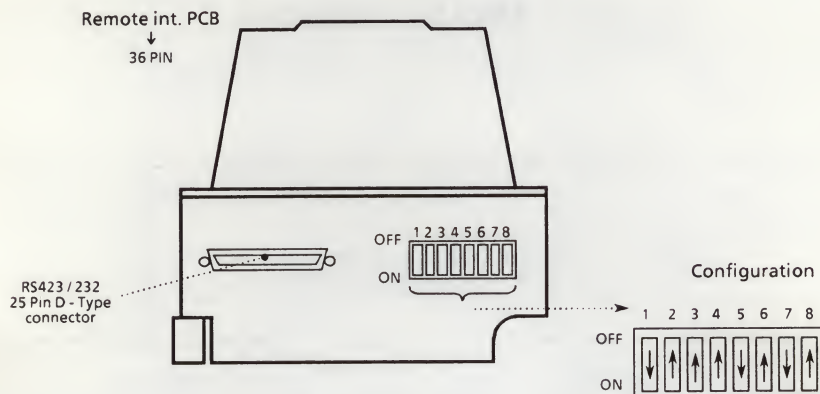
| Baud rate    | Switch settings |            |            |            |
|--------------|-----------------|------------|------------|------------|
|              | 1               | 2          | 3          | 4          |
| .110         | On              | Off        | On         | On         |
| .300         | Off             | On         | Off        | On         |
| 600          | On              | Off        | Off        | On         |
| 1.200        | Off             | Off        | Off        | On         |
| 2.400        | On              | Off        | On         | Off        |
| 4.800        | On              | On         | Off        | Off        |
| 7.200        | Off             | Off        | On         | Off        |
| <b>9.600</b> | <b>On</b>       | <b>Off</b> | <b>Off</b> | <b>Off</b> |
| 19.200       | Off             | Off        | Off        | Off        |

Switch 5 : ON Parity disabled  
 Switch 6 : N.A.  
 Switch 7 : ON 8 bit  
 Switch 8 : OFF Internal clock

### Option port C.

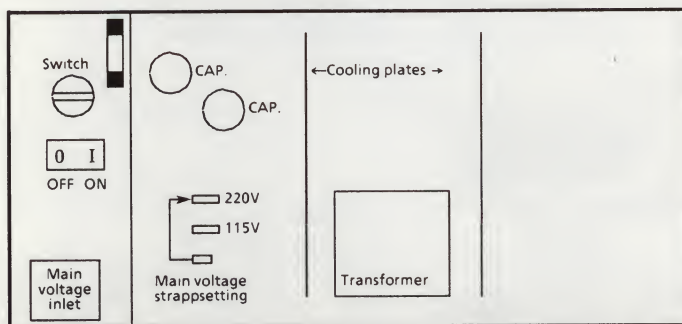
Use setting for S2000/S6000 HOST. Switch setting BAUD rate is the same as for port A and port B. The ON/OFF text is screened Up-side down on the rear panel of the option for the switches 5, 6, 7 and 8.

Default setting for P9000 m-system is : Switch 5, parity disable ( ON ),  
Switch 6, not applicable,  
Switch 7, 8 bits / character ( ON ),  
Switch 8, internal clock for local use ( OFF ).

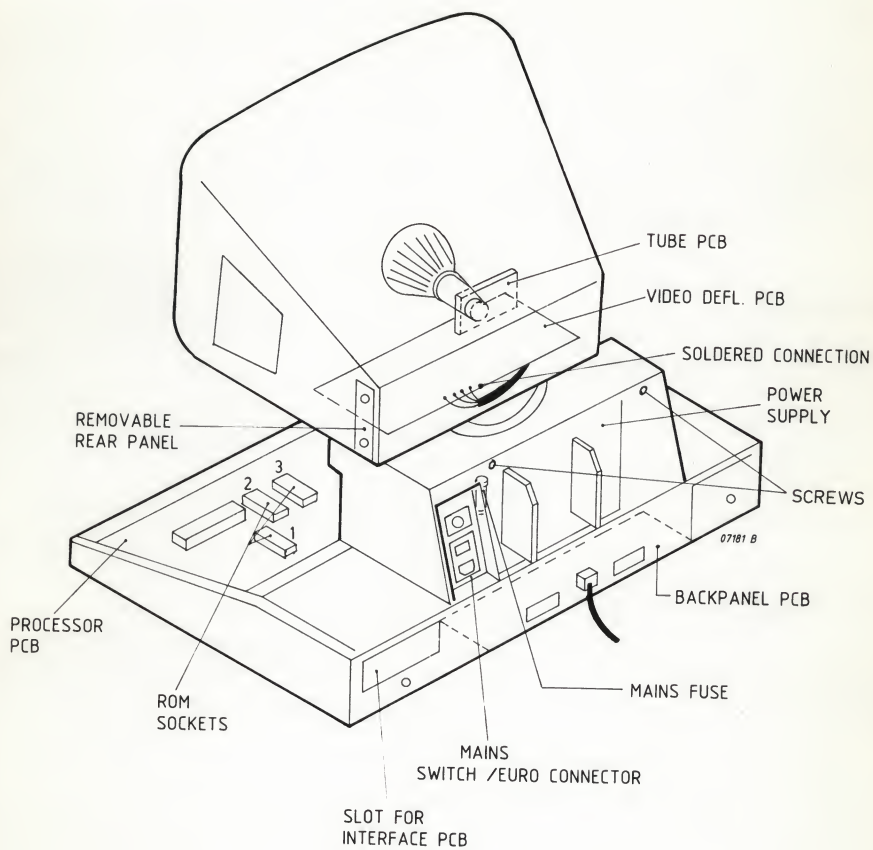


### Power Supply Mains Voltage Range and Fuse

The fuseholder is located behind the black mains inlet box. Type of fuse to use is a 1.5 A slow blow.



NOTE : Fuseholder (Fuse 1.5A Slow blow) behind mains inlet box



## 21.3.4 Installation

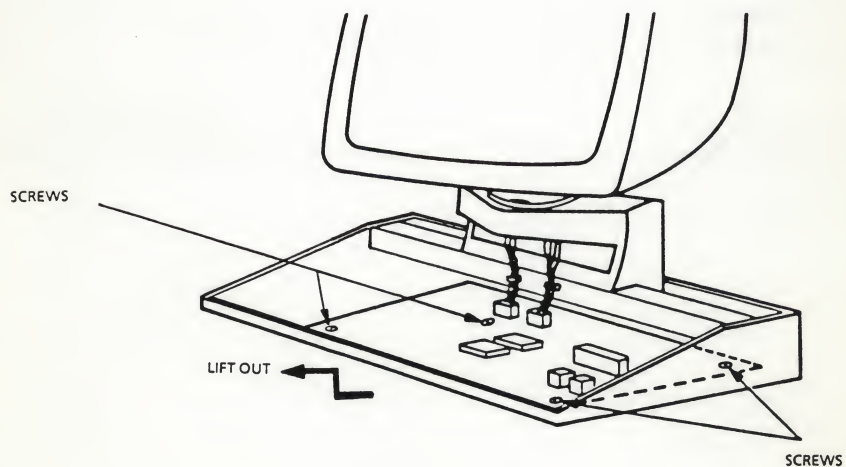
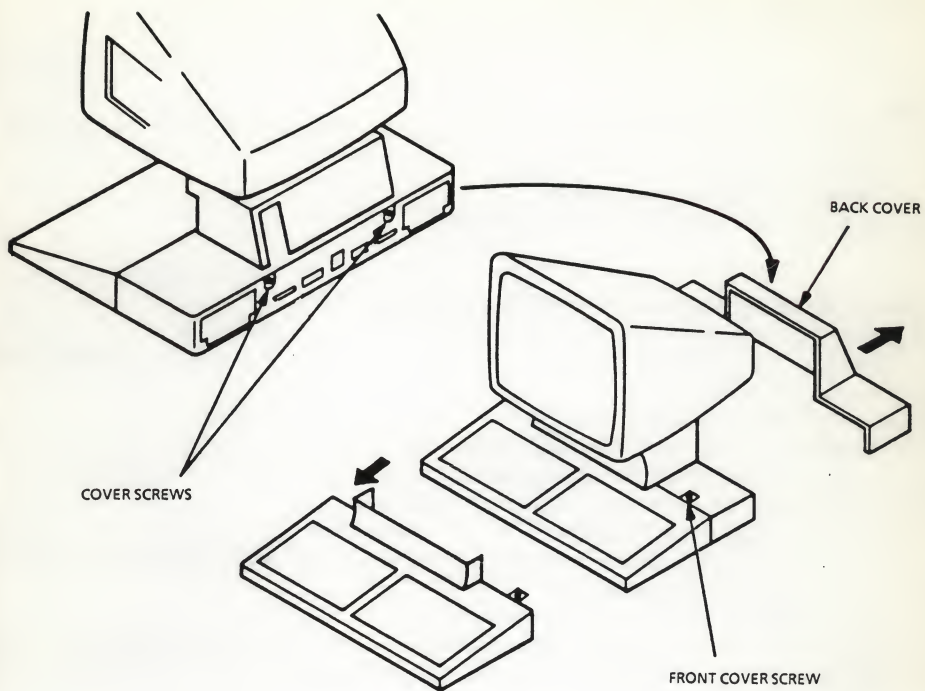
### Removal Processor pcb.

- Switch off and disconnect the mains cable, disconnect the data connection with the system and also disconnect the key-board.
- Remove the option pcb RS423 / RS422 and the dummy plate at the right side.
- Remove first the rear cover (remove two screws) and then the front cover (two screws or bolts).
- Remove the shielding plate at the front, no screws.
- Loosen the ground connection on the pcb.
- Remove the three screws that fix the pcb to the bottom plate.
- Disconnect the power supply DC cable, and the cable to the CRT driver board.
- Lift the pcb up at the front side and remove it, see next page.

### Replacement

- Follow the above described procedure in the reverse order to reinstall the processor pcb. Prior in doing this check the PROM levels.





### **Removal pcb for port A and B.**

- Loosen the three screws and slide out the pcb.

### **Replacement**

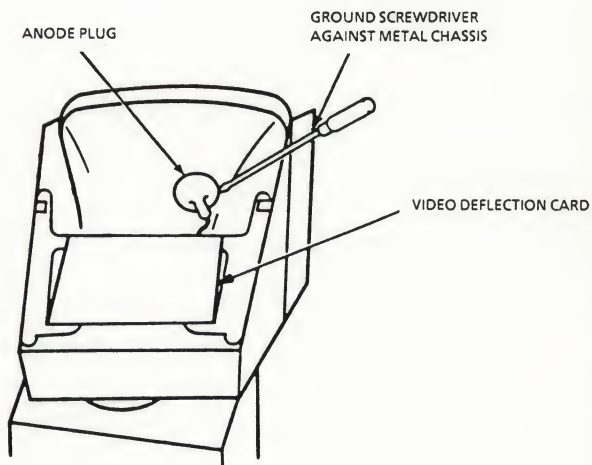
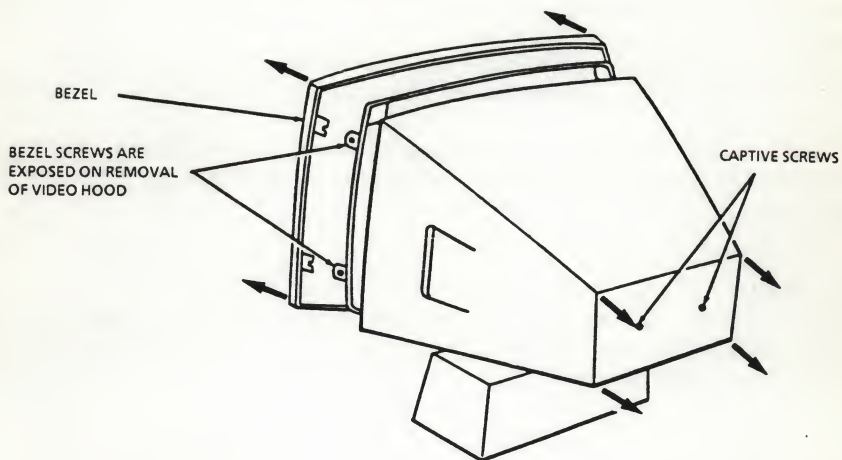
- Gently slide the pcb on its place and press it in the connector on the processor board.
- Tighten the three screws again.
- Check the strap setting of the DIL switches.

### **Removal Deflection pcb. and the Tube Assembly**

- Switch off and disconnect the mains cable.
- Remove the two bolts that hold the video hood at the rear and slide the hood backwards to remove it.
- Remove the shielding plate at the rear, two screws at each side.
- Discharge the tube and the anode supply wire.
  - Wait at least three minutes after power off before discharging the anode line.
    - Use a screwdriver with an isolated handgrip.
    - Connect the screwdriver to the grounded chassis.
    - Slide the flat side of the screwdriver gently under the anode fly-back pad and discharge the anode line.
- Disconnect the anode wire from the tube.
- Disconnect the the wires to the deflection coils, note down there colour, and disconnect the video tube. See also the coloured dots on the deflection coil assembly.
- Disconnect the brightness potentiometer cable
- Remove cable cover plate at the front of the sockel, one bolt.
- Disconnect the cable to the CRT driver board on the processor pcb.
- Remove the four screws that fix the CRT driver pcb to the top chassis.
- Remove the pcb with its cabling and take care not to damage the cable coming from the processor board that goes trough the hole in the sockel.

### **Replacement**

- This can be done by following most of the above described procedure in the reverse order.



### **Removal Power Supply and Key-switch/AC connection Assembly**

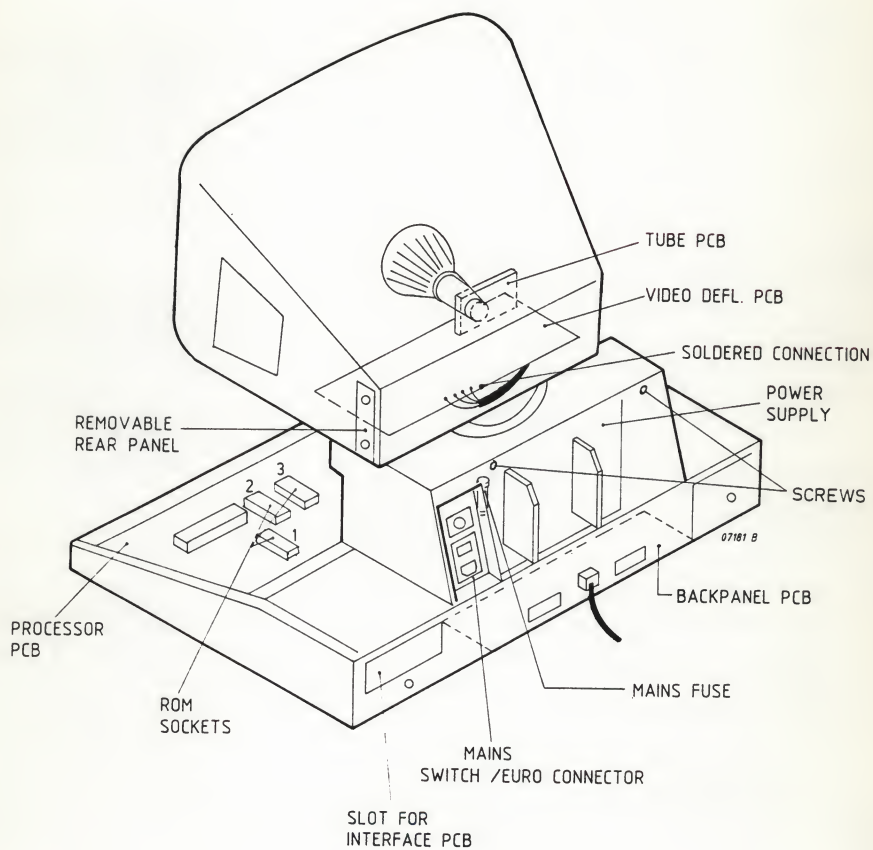
- Disconnect the mains cable after switching off the mains.
- Remove the option pcb and the cover plate at the right side, one screw each.
- Remove the rear- and the front bottom cover.
- Remove the front shielding plate.
- Remove and disconnect the ground connections of the PSU, one bolt and nut at each side.
- Remove the screw and nut that fix the key/AC connection box to the chassis.
- Disconnect the cable to the key-switch and the DC power cable to the processor board.
- At the top side of the power supply are two bolts that must be removed, after this is done the PSU pcb can be removed. Take care not to damage the key-switch- and DC cable.

### **Replacement**

- Replacement can be done by following the above described procedure in the reverse order. Check the mains strap setting before connecting the mains cable and closing the terminal housing.

## **21.3.5 Maintenance**

For Maintenance see chapter 21.2.5, FT 45 old model.





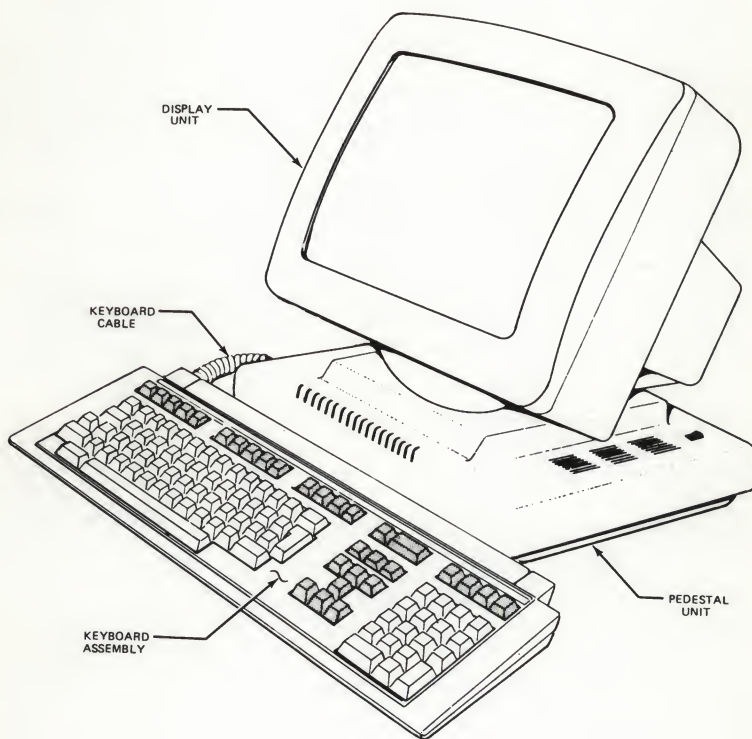


## 21.4 TM220

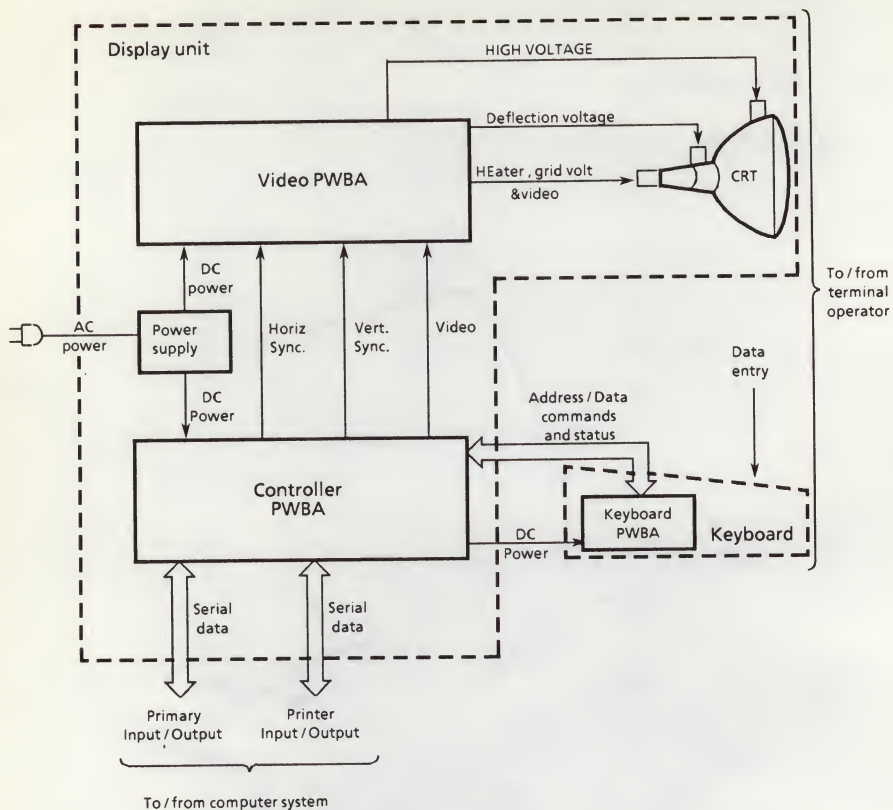
The TM220 is End Commercial Delivery

### 21.4.1 Characteristics

For the technical data, see section 21.1.

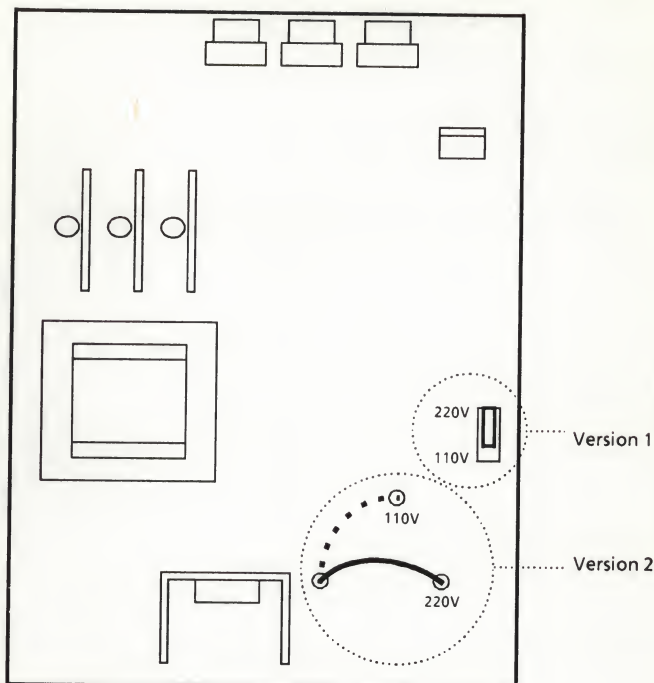


## 21.4.2 Connections



### 21.4.3 Strap Settings

Power Supply Mains voltage range and fuse.



#### Soft strapping of the terminal functions using the Set-Up screens.

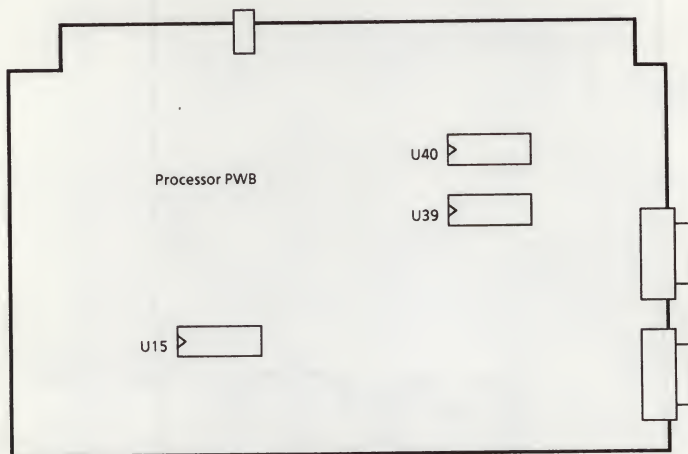
There are in total four set-up screens, see next pages. To enter the set-up mode press the SET-UP key on the keyboard, see below. Each set-up screen has a number of fields. All fields are shown in half tone, except the active field that is shown in full tone. To move from one field to an other field use the ARROW keys. To view the next set-up screen, activate the TO NEXT SET-UP SCREEN field; then press the ENTER key on the numeric keypad. Modifying parameters in a field can be done by pressing the ENTER key; to see all parameters, continue pressing the ENTER key.

Leaving the set-up mode can be done in two ways :

- Select SAVE CURRENT VALUES field in the first set-up screen and press the ENTER key. The setting are saved in non-volatile memory and are made active. To change them a new save current values has to be done.
- Press the SET-UP key. The parameters values in the non-volatile memory are not affected, so the changes you have made are temporary changes.

The most important settings are in communications set-up are:

- Transmit baud rate : 9600
- Parity / word : 8 bits no parity
- Stop bit : 1 stop bit
- Transmit control : Limited
- Protocol : XOFF at 64
- Receive baud rate : Transmit
- Receive parity : no check
- DTR control : normal



#### 21.4.4 Installation

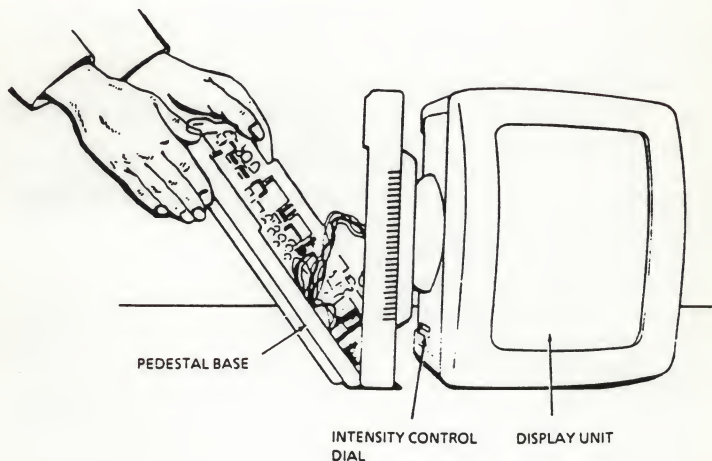
##### Removal Processor PWBA

- Switch off and disconnect the mains cable, disconnect the data connection with the system and also disconnect the key-board.
- Tilt the display assembly until the unit is resting on its side.
- Remove the four screws on the underside of the pedestal unit.
- Gently force the bottom cover away from the display and put it on the table.
- Tag and disconnect any cable connected to the processor board.
- Using a Phillips screwdriver, remove the 8 screws holding the board in place.
- Slowly slide the board away from the two RS232 C serial ports. When the serial connectors are free of their ports, lift the board up and out of the unit.



### Replacement

- To replace the board reverse the procedure described above. Make sure the board is firmly seated before replacing the screws.



### Removal Power Supply PWBA

- Switch off and disconnect the mains cable, disconnect the data connection with the system and also disconnect the key-board.
- Tilt the display assembly until the unit is resting on its side.
- Remove the four screws on the underside of the pedestal unit.
- Gently force the bottom cover away from the display and put it on the table.
- Tag and disconnect any cable connected to the power supply board.
- Using a Phillips screwdriver, remove the four screws holding the power supply board in place.
- Remove the power supply board.

### Replacement

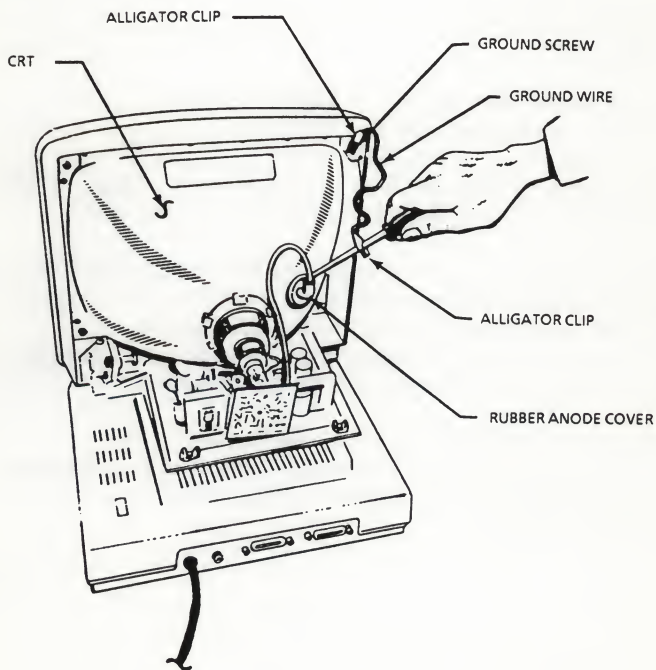
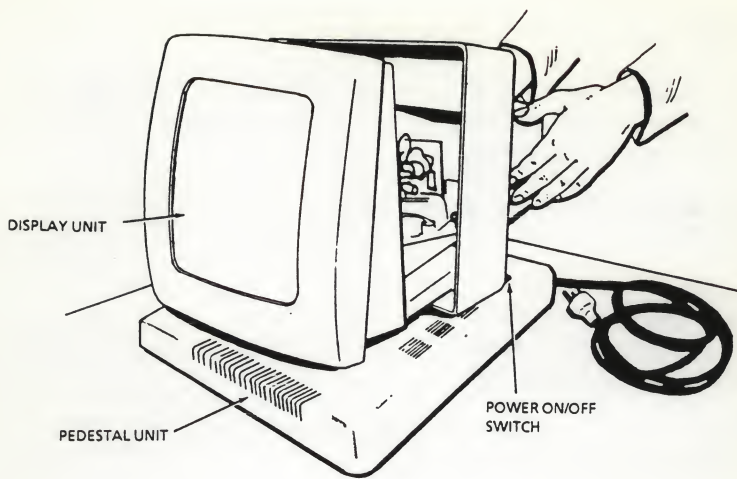
- Follow the above described procedure in the reverse order to reinstall the power supply board. Prior in dowing this check the mains range strap for its setting for the correct voltage range.

### **Removal Video Deflection PWBA**

- Switch off and disconnect the mains cable, disconnect the data connection with the system and also disconnect the key-board.
- Using a Phillips screwdriver, remove the two screws at the rear of the display.
- Carefully slide the cover backwards for a little space between the cover and the bezel at the front.
- Put a small blade screwdriver between the bezel and the cover, press the cover down a little and slide it backwards until you can lift it off.
- Discharge the CRT tube and the anode supply wire :
  - Wait at least three minutes after power off before discharging the anode line.
  - Use a screwdriver with an insulated handgrip.
  - Connect the screwdriver to the grounded chassis.
  - Slide the flat side of the screwdriver gently under the anode fly-back pad and discharge the anode line and the tube.
- Disconnect the anode wire from the tube.
- Tag and disconnect any cable connected to the board.
- Disconnect the small pcb from the tube connector.
- Remove the two nuts holding the board in place.
- Lift the board up at the rear and gently slide it backwards away from the CRT.

### **Replacement**

- This can be done by following most of the above described procedure in the reverse order.



## 21.4.5 Maintenance

### Test and Diagnostics

The terminal is equipped with a power-up self-test. This test runs in less than 5 sec. . After the self-test is completed, a beep will sound and a message " M220 OK " will be displayed in the middle of the screen.

The self-test operation will test the following items:

- CMOS RAM (checksum of terminal set-up information),
- DATA RAM,
- DISPLAY RAM,
- PROGRAM ROM
- DOWN-LOAD CHARACTER RAM,
- CHARACTER GENERATOR ROM.

The result of the self-test is displayed in the form of the following messages :

- CMOS RAM CHECKSUM ERROR,
- DATA RAM ERROR,
- DISPLAY RAM ERROR,
- PROGRAM ROM ERROR
- DOWN-LOAD CHARACTER RAM ERROR,
- CHARACTER GENERATOR ROM ERROR,
- Message " M220 OK "

If an error message is displayed on the screen, act as follows :

- Press ESC [4; 1 y to reset the terminal.
- Verify any error messages :
  - If the error message no longer displays, the terminal is ready to operate.
  - If the error message still displays exchange the processor PWBA.

The following functions can be used when adjusting the video deflection board :

- Press the SET-up key followed by pressing the 9 key from the alphanumeric keypad.  
The results is the hole screen is filled with the capital letter M.
- Press the SET-up key followed by pressing the 0 key from the alphanumeric keypad.  
The results is the hole screen is filled with the capital letter E.

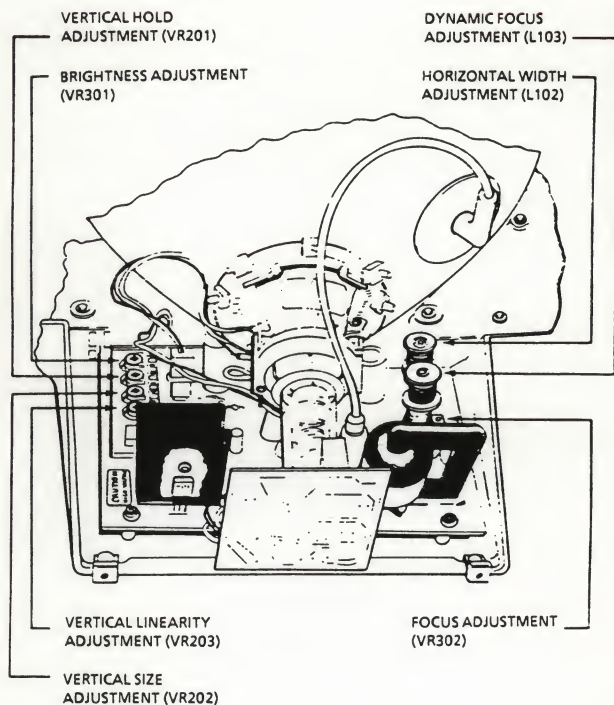
After adjusting this can be tested with the following function :

- Press the SET-up key followed by pressing the 1 key from the alphanumeric keypad.  
The hole screen is filled with the contents of the character generator for aswell 80 as 132 colonm per screen.



## Adjustments

### Video deflection board







## 21.5 M4305 MICROVITEC

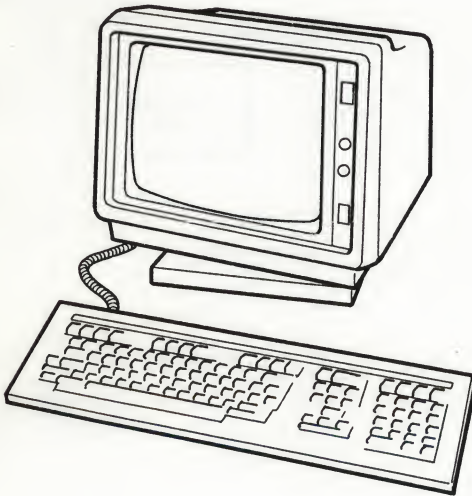
The M4305 Microvitec colour graphics terminal is End Commercial Delivery

### 21.5.1 Characteristics

The M4305 is a colour graphics terminal emulating the Teletronix 4105A, and providing a number of additional features:

- Graphic resolution of 480 hor. x 360 vert.
- 16 colours from a palette of 4090.
- Independent control for text and graphics.
- A RS232 and a Centronics port to attach a printer.
- DEC VT200 type of keyboard.
- Ability to define macros.
- Terminals with a factory fitted option support mouse and trackerball.

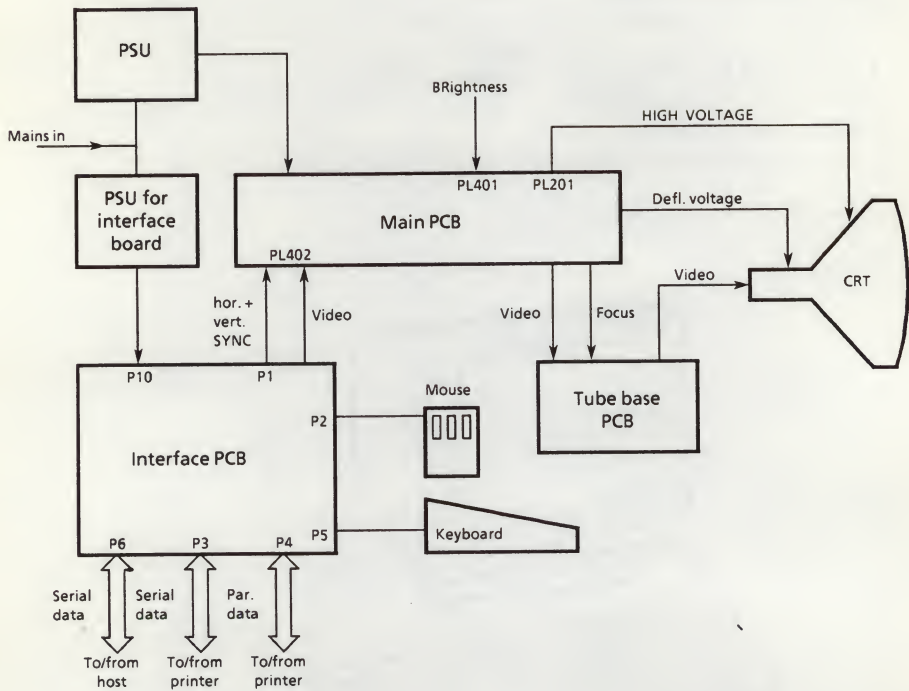
For the technical data, see section 21.1.



## 21.5.2 Connections

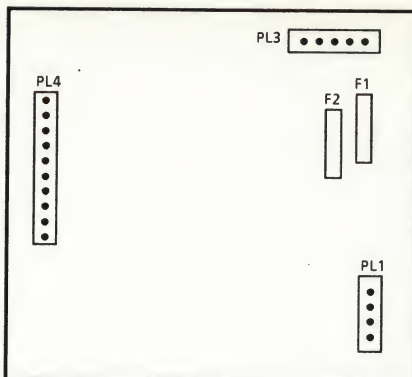
This terminal contains 5 PBCs:

- PSU
- PSU for the interface board
- Interface board
- Drive / deflection board
- Tube base PCB

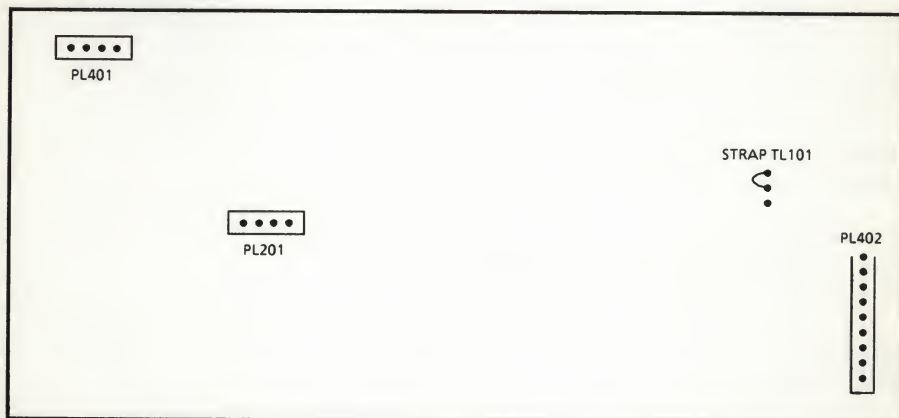


### 21.5.3 Strap Settings

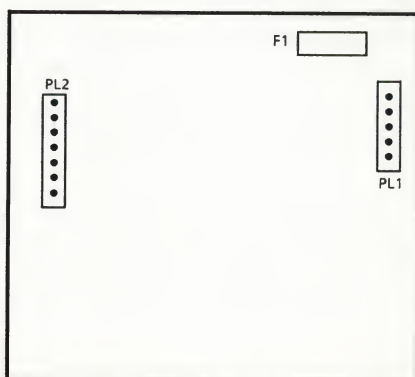
PSU



Deflection board



PSU for interface board



## **Soft Strapping of the Terminal using the SETUP screen**

Setup is a mode of operation in which most terminal features may be configured locally by the user without host computer intervention.  
Setup is a menu driven system.

Setup pages cover the following areas:

### **COMMUNICATIONS FEATURES:**

Configuration of the host and printer ports.  
Hardcopy attributes.  
Communications modes.  
Emulation mode.

### **GENERAL FEATURES:**

Dialogue area / buffer attributes.  
Software compatibility features.  
User convenience features.  
Keyboard control.

### **DIALOGUE AREA COLOURS:**

Definition of the colour table.

### **GRAPHICS PLANE COLOURS:**

Definition of the colour table.

### **GRAPHICS FEATURES:**

Aspects relative to all graphics primitives.  
Graphics input mode.

### **MACROS:**

Macro editing facilities.

Setup may be entered at any time by pressing the key labelled SETUP in the top left hand corner of the keyboard.

If setup is being entered for the first time after power-up or a reset then the first page will be selected, otherwise the previously displayed setup page will be selected. It is possible to always select the first page by use of the shift SETUP key.

Exit from setup is achieved by pressing the SETUP key a second time at any point (except when editing a macro) from within setup.

A standard setup page has two lines of title, the first being common to all pages and the second indicating the broad classification of the page. Below these title lines are two columns of information grouped together under sub-titles. Each line of information contains the name of a feature and the current value assigned to that feature separated by a colon.



In some positions the line cursor will show a flashing block character cursor over the variable part of the line, in other positions no such cursor will be visible. If this character cursor is visible then the feature selected may be modified by typing in a new value from the keyboard. If the character cursor is not visible, however, the feature is modified by cycling through a list of alternatives by use of the right and left arrow keys. Moving from one setup page to another is achieved by use of the up and down arrow keys.

Moving from one page to another is achieved by use of the Next Scrn and Prev Scrn keys on the editing pad.

Pressing the SETUP key in conjunction with shift (labelled SAVE) will cause the values of all savable features to be saved in non volatile memory,

Pressing the RESET key in conjunction with shift (labelled DFLT) causes all terminal features to revert to their factory defaults.

### **Setup of Colours**

To setup colour definitions, the DIALOGUE AREA COLOURS screen and the GRAPHIC PLANE COLOURS screen are used.

Each screen gives the ability to define 16 colours. These colours then can be used in the text area and in the graphics area.

To define a colour, three parameters are used: hue, lightness and saturation.

Hue is the property often referred to as colour and takes a value of 0 - 359 degrees. Zero degrees is blue and proceeding clockwise (increasing hue), hue passes through magenta, red, orange, yellow, green and cyan back to blue. Lightness is a measure of the light intensity and takes a percentage value, 0% representing black and 100% representing white.

Saturation is a measure of the degree of colour and takes a percentage value, 0% representing shades of grey and 100% representing full colour. When the colour cone is considered a few properties of the HLS system will become evident. For example, if lightness is 0%, the colour will always be black or white respectively, irrespective of the values of hue or saturation. Similarly, when saturation is 0%, the colour will always be a grey shade, irrespective of the value of hue.

To select a colour, use the SELECT key.

To change the colour, type in h, l or s to change hue, lightness or saturation. Then use the arrow keys to change values.

To select the colours for background and text, goto the GENERAL FEATURES screen, goto DA indices and change the three given values into the numbers of the colours you want to select from the DIALOGUE AREA COLOURS screen.

Use shift SETUP to save current setup.

## 21.5.4 Installation

**WARNING:** *Ensure the monitor is disconnected from the mains electrical supply before effecting any of the following operations.*

**DANGER!!**

**NOTE:** *The tube stays charged to the full working voltage of 25kV:  
Discharge the tube before attempting to remove the EHT (poppy).  
Observe the warning to delay handling the chassis for 30 - 60 seconds after switch.*

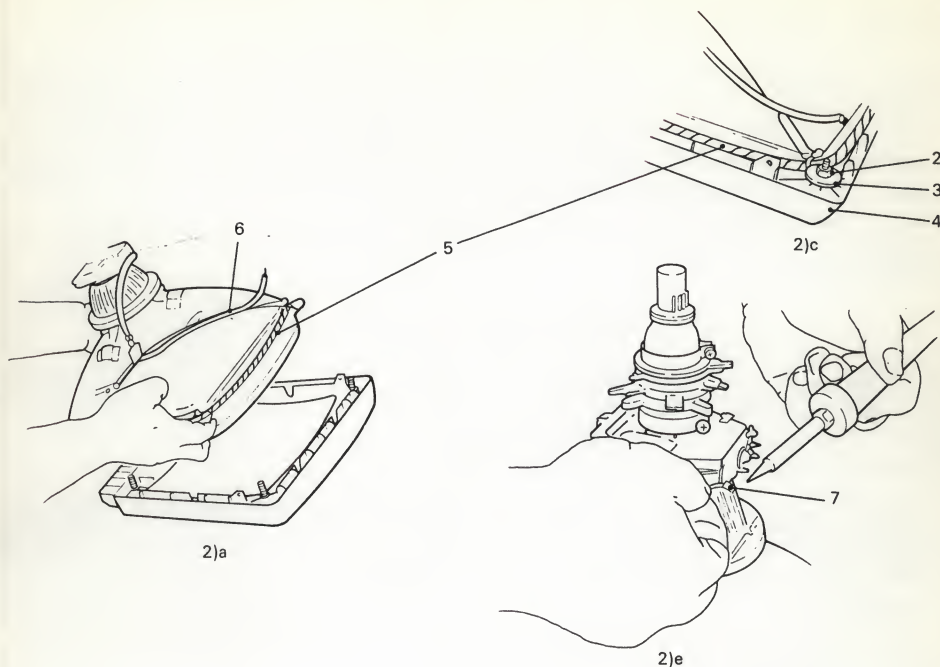
### 1. Chassis Assembly / Removal

Having gained access by removing the appropriate cabinet sections, proceed as follows:

- a. Discharge the tube final anode to CRT dag coating, preferably using EHT probe or bleed resistor.  
Disconnect the EHT lead from the CRT final anode connection.  
To ensure no charge remains, connect the EHT lead to chassis metalwork.
- b. Completely discharge the CRT final anode by connecting to CRT dag coating/ earthing braid.
- c. Unplug connectors PL401, PL402, PL403, PL201 on the Main Chassis/Driver PCB, and connectors PL1, PL3, PL4 on the Switched Mode Power Supply. If required detach also input/output connectors from the Interface PCB assembly.
- d. Unplug CRT earth braid lead from dag earth braid pin on Tube Base Panel marked 'CRT' on 'SERIES-6 TB'.
- e. The Main Chassis Driver/deflection PCB assembly and the Tube base PCB assembly may now be detached from their housing. Similarly, the Switched Mode Power Supply and Interface PCB assembly may also be removed at this stage if required.
- f. Remove individual PCB assemblies as required. To do this release in turn each of the nylon self-locking PCB support clips, lifting the PCB slightly in each case.
- g. Detach as required the various earthing lead flexible connections.

**Important Note:** *Ensure on re-assembly the ALL earth connections are replaced SECURELY; in particular safety earths and the 'P' band and dag earth 'CRT' earth connections.*

**For Installation, the operations listed above should be carried out in reverse order.**



## 2. CRT Removal / Installation

- a. Effect operation 1a through to 1g, then position monitor so that the CRT is face down on a padded support surface (see illustrations above).
- b. Remove earthing leads and earthing screws/nuts (see 1d and 1g preceeding).
- c. Remove the four nuts (2) and large washers (3) securing CRT to cabinet fascia (4).
- d. Carefully withdraw CRT vertically.
- e. Transfer degauss coil (5) and earthing braid (6) and scan coil lead assembly (7) to new CRT.

**Important:** Do not disturb the tube neck components. These have been set for optimum performance during manufacture and are an integral part of the tube system.

- f. Re-install PCB assemblies by effecting operations 1a through to 1g in reverse order.
- g. CRT installation safety checks:
  1. Check for correct fitting of CRT earthing braid (6).
  2. Ensure black lead from CRT earth braid to tube base is connected.
  3. Check 'P' band earth has been re-connected.



## 21.5.5 Maintenance

### Test and Diagnostics

Self test mode is entered by pressing SETUP in conjunction with the CTRL and SHIFT keys. Normal terminal operation is resumed by pressing the same combination of keys whenever a menu is being displayed. On entering self test mode, the following main menu will be displayed as blocks along the bottom of the screen and the first of these sub-menus will be displayed in the centre of the page.

Whenever a sub-menu is displayed this main menu will also be visible to reduce key depressions.

JOY ↑ : MEMORY AND PERIPHERAL TESTS  
JOY ↓ : COMMUNICATIONS PORT TESTS  
JOY → : KEYBOARD TEST  
JOY ← : ALIGNMENT PAGES  
PF1 : STANDARD TEST CYCLE

For the joy-keys, use function keys F17 - F20.

Pressing the key indicated will either execute the function specified for the keyboard test or the standard test cycle or in the case of the other keys display a sub-menu from which the user may make a further selection. Pressing the ENTER key cycles through the sub-menus.

The different submenus are:

#### Memory and Peripheral Tests

This group of tests allows all memory and peripherals connected to the main processor to be diagnosed.

JOY ↑ : GENERAL RAM  
JOY ↓ : DIAGLOGUE SCREEN RAM  
JOY → : GRAPHICS SCREEN RAM  
JOY ← : 68681 DUART TIMERS  
PF1 : GRAPHICS Y-CLICK COUNTER  
SHIFT PF3 : ALL TESTS  
SHIFT PF4 : REPEAT TEST(S)

#### Communications Port Tests

This group of tests allows all communications ports to be tested. Loop back connectors and special hardware is required to perform these test correctly.

JOY ↑ : HOST PORT  
JOY ↓ : PRINTER / GIN PORT (RS232)  
JOY → : PRINTER PORT (CENTRONICS)  
JOY ← : GIN PORT (TTL)  
PF1 : KEYBOARD PORT  
SHIFT PF3 : ALL TESTS  
SHIFT PF4 : REPEAT TEST(S)

## Keyboard Port

This test provides a functional test of the keyboard port. A message will indicate successful operation or an error condition. No loopback connector is required for this test.

## Keyboard Test

The purpose of this test is to prove that each key on the keyboard is operative, that the indicator lights may be illuminated and that the various sounders within the keyboard are operational.

## Alignment Pages

This sub-menu allows a number of test pages to be displayed. These pages are mostly intended for monitor alignment. The following menu is displayed on selecting this group of tests:

```
JOY ↑ : LINEARITY TEST
JOY ↓ : FREQUENCY BARS
JOY → : FULL SCREEN WHITE
JOY ← : FULL SCREEN RED
PF1 : FULL SCREEN GREEN
PF2 : FULL SCREEN BLUE
PF3 : COLOUR BARS
PF4 : ROLLING CHARACTER SET
SHIFT JOY ↑ : CONVERGENCE - WHITE
SHIFT JOY ↓ : CONVERGENCE - YELLOW
SHIFT JOY → : CONVERGENCE - MEGENTA
SHIFT JOY ← : CONVERGENCE - CYAN
SHFIT PF1: TEXT COLOUR 0
SHIFT PF3: ALL TESTS
SHIFT PF4: REPEAT TEST(S)
```

## Standard Test Cycle

Selecting this option does not cause a sub-menu to be displayed. Instead it causes a standard set of tests, selected from the various sub-menus to be executed. This provides a quick means of verifying certain aspects of terminal operation. Clearly it does not give as comprehensive a test as can be achieved by using the sub-menus to select tests specifically. The cycle may be initiated in one of two ways, the RETURN key or the shift RETURN key. If the cycle is initiated by the former method the cycle will continue if an error is detected whereas initiating the cycle by the latter method will cause it to terminate on detection of an error.

The following tests are carried out:

|                          |                            |
|--------------------------|----------------------------|
| General RAM              | Host PORT                  |
| Dialogue Screen RAM      | Printer / GIN PORT (RS232) |
| Graphics Screen RAM      | Printer PORT (Centronics)  |
| 68681 Duart Timers       | GIN PORT (TTL)             |
| Graphics Y-Click Counter | Keyboard PORT              |



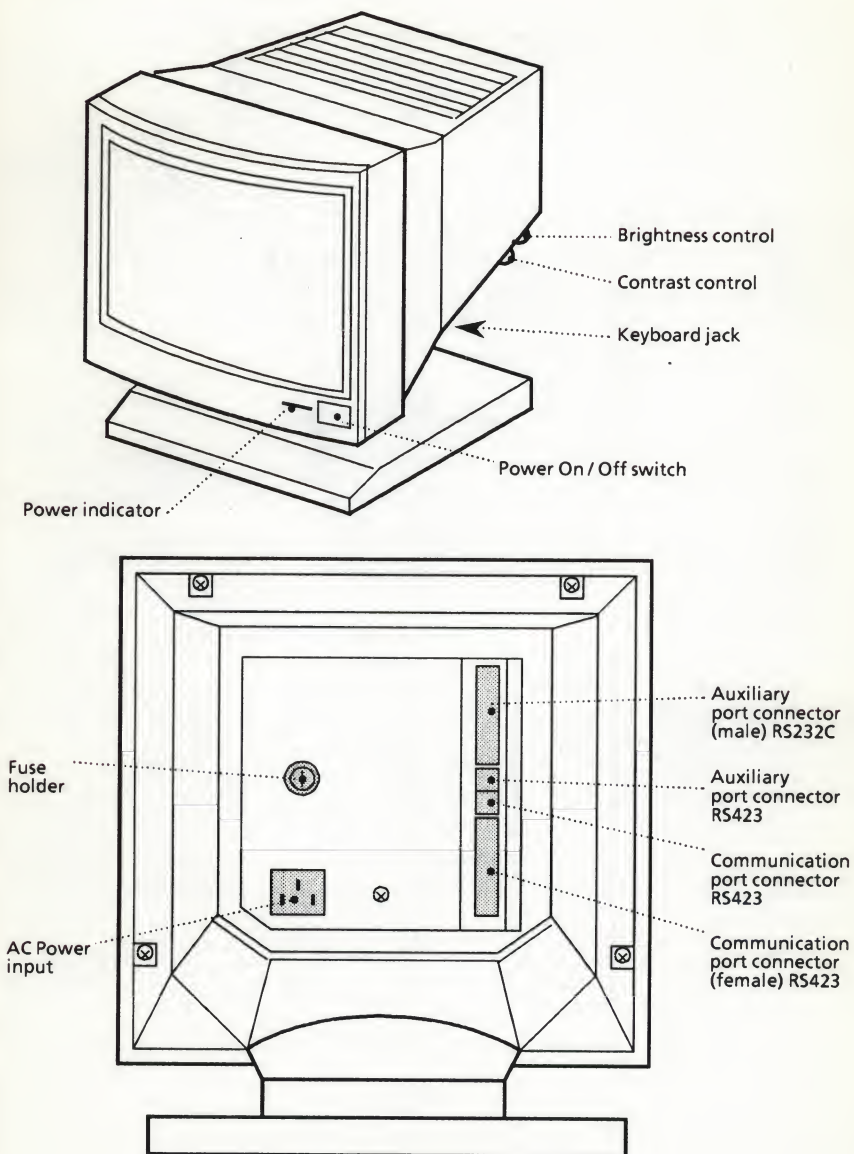
The above display is shown on entering this page and the actual test being executed is highlighted once the cycle is initiated.

Since this cycle carries out all the communication port tests, it is necessary to insert the appropriate loopback connectors into the host, RS232 printer / GIN, Centronics printer and TTL GIN ports before carrying out this test.

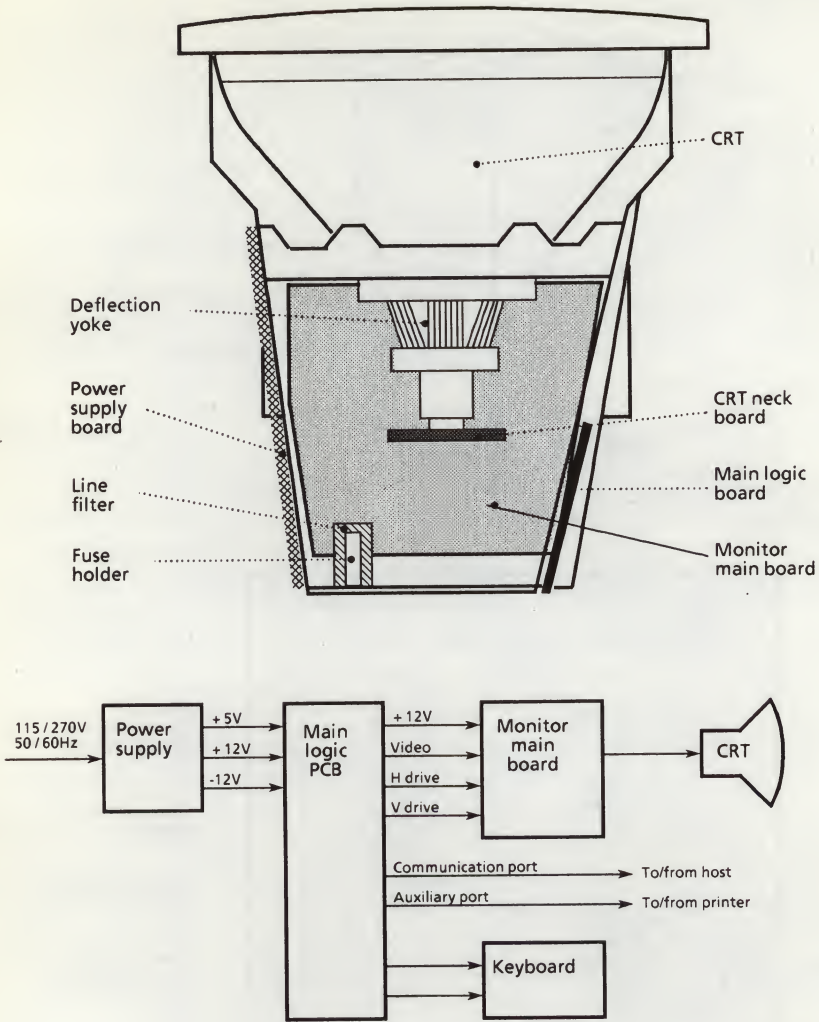
If the option to support the mouse and trackerball is not fitted then the GIN PORT (TTL) test will not be executed.

## 21.6 P2701 C-ITOH CIT-324

### 21.6.1 Characteristics



21.6.2 Connections



### Power Supply Mains voltage range and fuse.



The parameters belonging to each selected field are shown at the bottom of the respective Set-Up menus.

- Select **SAVE CURRENT VALUES** field in the first set-up screen and press the **ENTER** key. The setting are saved in non-volatile memory and are made active. To change them a new save current values has to be done.
- Press the **SET-UP** key. The parameters values in the non-volatile memory are not affected, so the changes you have made are temporary changes.

The most important settings are in communications set-up. (See figure below).

- Transmit baud rate : 9600
- Parity / word : 8 bits no parity
- Stop bit : 1 stop bit
- Transmit control : Limited
- Protocol : XOFF at 64
- Receive baud rate : Transmit
- Receive parity : No check
- DTR control : Normal

### Set-Up Help Menu

|                                    |       |               |
|------------------------------------|-------|---------------|
| Main Set - Up Menu .....           | Press | <b>F6</b>     |
| Terminal Set - Up Menu .....       | Press | <b>F7</b>     |
| Display Set - Up Menu .....        | Press | <b>F8</b>     |
| Keyboard Set - Up Menu .....       | Press | <b>F9</b>     |
| Communications Set - Up Menu ..... | Press | <b>F10</b>    |
| Auxiliary Set - Up Menu .....      | Press | <b>F11</b>    |
| Tabs Set - Up Menu .....           | Press | <b>F12</b>    |
| Exit Set - Up Menu .....           | Press | <b>Set-Up</b> |

(01, 001) REPLMODE PRNTR : NONE



## 21.6.4 Installation

**CAUTION:** *The PBC's of the P2701 and P2702 are different, therefore they cannot be interchanged!*

*The P2701 (CIT-324) can be identified via:*

- *the text on the label on the top cover housing;*
- *the label of IC2 on the main logic board.*

### Removal of Top Cover Housing

- Switch off and disconnect the mains cable, disconnect the data connection with the system and disconnect the keyboard.
- Turn the display and remove the five Phillips screws from the rear of the top cover.
- Lift and remove the top cover.

### Removal of Main Logic Board

- Remove the top cover housing.
- Disconnect the logic board connectors J3, J4 and J5.
- Remove the two Phillips screws at the left of the PCB.
- Release the two plastic stand-offs at the right side of the PCB and take off the PCB.

### Replacement

- To replace the main logic board reverse the procedure above.

### Remove of Power Supply Board

- Remove the top cover housing.
- Discharge the high voltage.
- Disconnect the connectors J11 and J12.
- Remove the six Phillips screws that fix the power supply board.

### Replacement

To replace the power supply board reverse above procedure.

### Removal of the Monitor Main Board

- Remove the top cover housing.
- Discharge the high voltage.
- Remove the plastic front plate of the CRT by loosening the two Phillips screws on the left and the two screws on the right side of the front plate.
- Release the bottom of the metal frame by removing the four Phillips screws that retain the frame.
- Disconnect the high voltage anode and the harness connection at the CRT neck.
- From the main monitor board, disconnect J4 and the ground wire at 64.
- To remove the main monitor board remove the six Phillips screws which retain the board to the chassis frame.

### Replacement

- To replace the main monitor board reverse the procedure above.

## 21.6.5 Maintenance

### Test and Diagnostics

The terminal is equipped with a power-up self test.

After successful completion of the self test, a beep will send and a message will be displayed in the middle of the screen.

The self test diagnostic firmware includes:

- RAM test (read/write test at each location);
- ROM test (checksum comparison based on LRC calculation);
- NUR test (checksum comparison).

Self test failures are displayed in the following way:

- RAM failure;
- ROM failure;
- NUR error;
- Keyboard error.

To clear the display type:

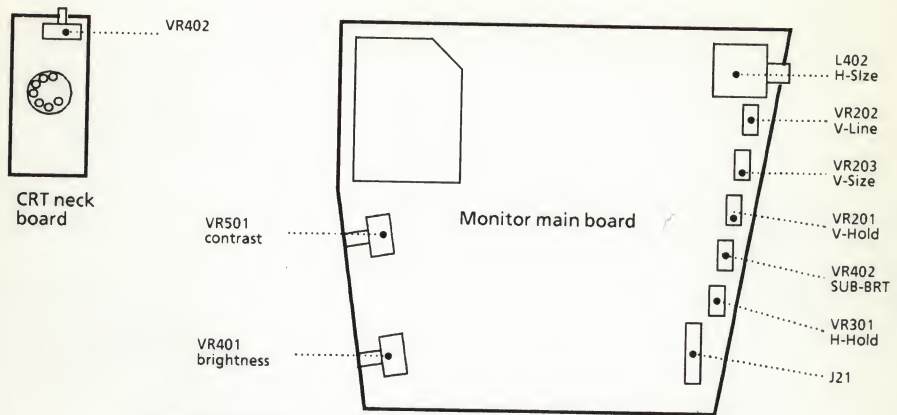
ESC [J or enter-Set-Up mode; Clear display.

The following functions can be used when adjusting the monitor main board:

- Switch local each to 'on' in the Communications Set-Up menu;
- Press Set-Up to exit;
- Press ESC # 8 (in that order!) to fill the screen with capital letters E;
- Press ESC # 9 (in that order!) to fill the screen with character assortment;
- These displays can be used in either 80 or 132 character columns.

## Adjustments

### Monitor Main Board Video Controls

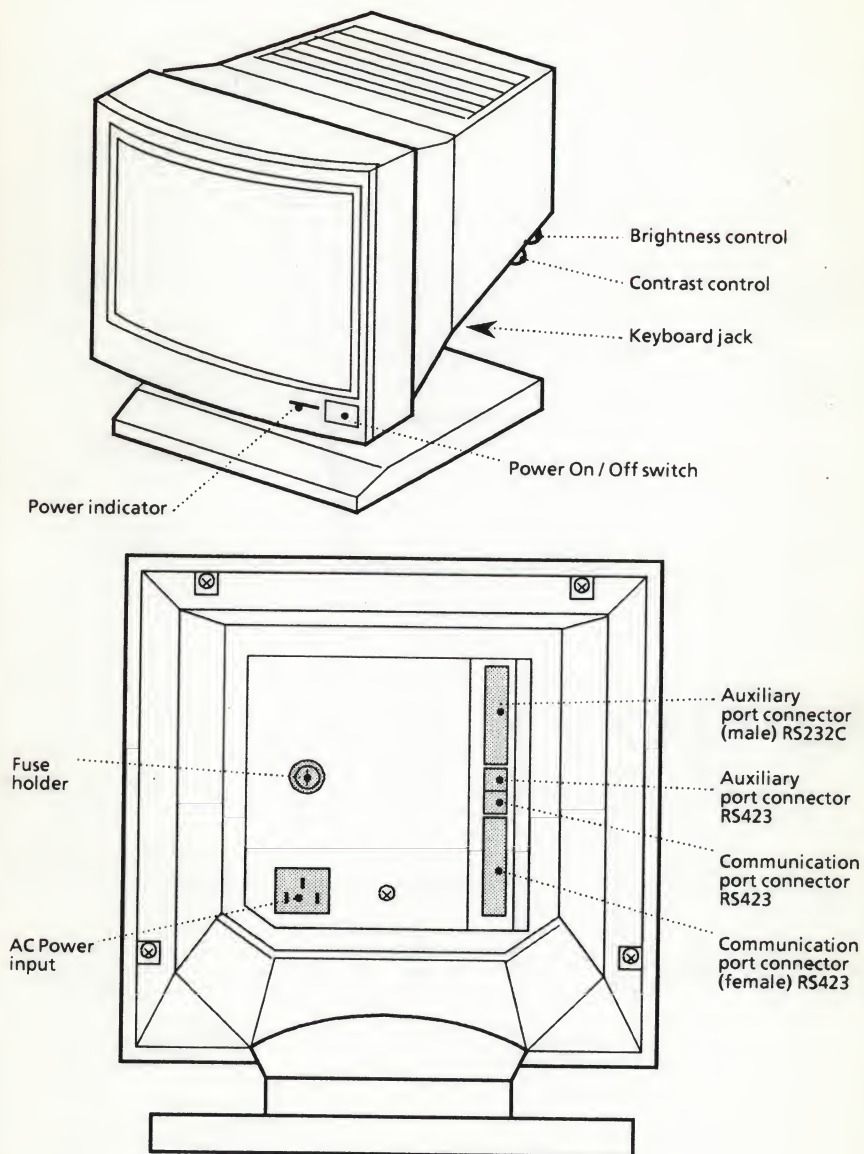


| CONTROL I.D. | FUNCTION           |
|--------------|--------------------|
| VR301        | Horizontal hold    |
| VR203        | Vertical size      |
| VR202        | Vertical linearity |
| VR601        | Focus              |
| VR402        | SUB-brightness     |
| VR401        | Brightness         |
| VR501        | Contrast           |
| L402         | Horizontal size    |
| VR201        | Vertical hold      |



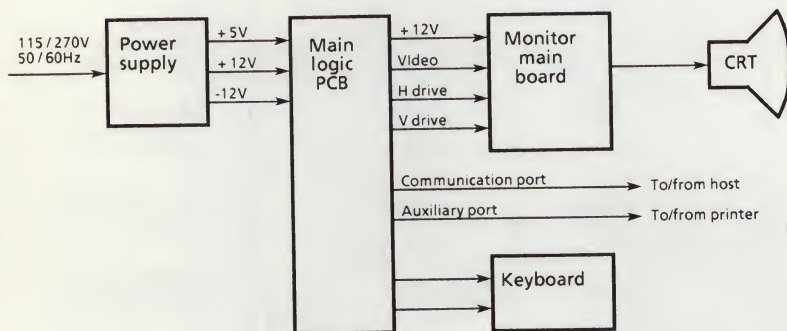
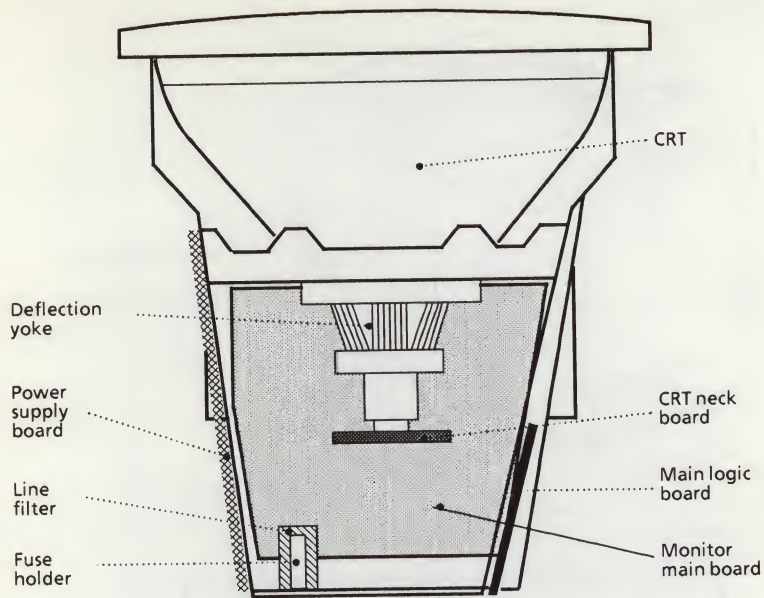
## 21.7 P2702 C-ITOH CIT-324 +

### 21.7.1 Characteristics



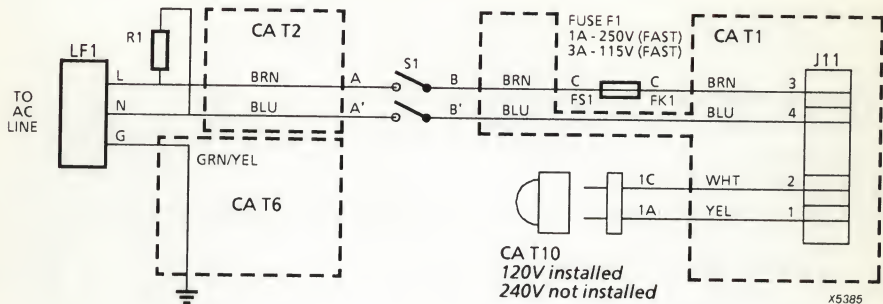


## 21.7.2 Connections



### 21.7.3 Strap Settings

Power Supply Mains voltage range and fuse.



#### Softstrapping of the terminal functions using the Set-Up screens.

There are in total fourteen set-up screens. To enter the set-up mode press the SET-UP key on the keyboard. Each set-up screen has a number of fields. All fields are shown in half tone, except the active field that is shown in full tone. To move from one field to another field use the ARROW keys. To view the next set-up screen, activate the TO NEXT SET-UP SCREEN field; then press the ENTER key on the numeric keypad. Modifying parameters in a field can be done by pressing the ENTER key.

The parameters belonging to each selected field are shown at the bottom of the respective Set-Up menus.

Leaving the set-up mode can be done in two ways :

- Select SAVE CURRENT VALUES field in the first set-up screen and press the ENTER key. The setting are saved in non-volatile memory and are made active. To change them a new save current values has to be done.
- Press the SET-UP key. The parameters values in the non-volatile memory are not affected, so the changes you have made are temporary changes.

The most important settings are in communications set-up. (See figure below).

- Transmit baud rate : 9600
- Parity / word : 8 bits no parity
- Stop bit : 1 stop bit
- Transmit control : Limited
- Protocol : XOFF at 64
- Receive baud rate : Transmit
- Receive parity : No check
- DTR control : Normal

### Set-Up Help Menu

|                                    |       |            |
|------------------------------------|-------|------------|
| Main Set - Up Menu .....           | Press | <b>F6</b>  |
| Terminal Set - Up Menu .....       | Press | <b>F7</b>  |
| Display Set - Up Menu .....        | Press | <b>F8</b>  |
| Keyboard Set - Up Menu .....       | Press | <b>F9</b>  |
| Communications Set - Up Menu ..... | Press | <b>F10</b> |
| Auxiliary Set - Up Menu .....      | Press | <b>F11</b> |
| Graphics Set - Up Menu .....       | Press | <b>F12</b> |
| Local Editing Set - Up Menu .....  | Press | <b>F13</b> |
| Tabs Set - Up Menu .....           | Press | <b>F14</b> |

1 1 (01,001) REPL PRNTR : NONE

## 21.7.4 Installation

**CAUTION:** *The PBC's of the P2702 and P2701 are different, therefore they cannot be interchanged!*

*The P2702 (CIT-324 +) can be identified via:*

- *the text on the label on the top cover housing;*
- *the label of IC2 on the main logic board (see section 21.7.4).*

### Removal of Top Cover Housing

- Switch off and disconnect the mains cable, disconnect the data connection with the system and disconnect the keyboard.
- Turn the display and remove the five Phillips screws from the rear of the top cover.
- Lift and remove the top cover.

### Removal of Main Logic Board

- Remove the top cover housing.
- Disconnect the logic board connectors J3, J4 and J5.
- Remove the two Phillips screws at the left of the PCB.
- Release the two plastic stand-offs at the right side of the PCB and take off the PCB.

### Replacement

- To replace the main logic board reverse the procedure above.

### Remove of Power Supply Board

- Remove the top cover housing.
- Discharge the high voltage.
- Disconnect the connectors J11 and J12.
- Remove the six Phillips screws that fix the power supply board.

### Replacement

To replace the power supply board reverse above procedure.

### Removal of the Monitor Main Board

- Remove the top cover housing.
- Discharge the high voltage.
- Remove the plastic front plate of the CRT by loosening the two Phillips screws on the left and the two screws on the right side of the front plate.
- Release the bottom of the metal frame by removing the four Phillips screws that retain the frame.
- Disconnect the high voltage anode and the harness connection at the CRT neck.
- From the main monitor board, disconnect J4 and the ground wire at 64.
- To remove the main monitor board remove the six Phillips screws which retain the board to the chassis frame.

### Replacement

- To replace the main monitor board reverse the procedure above.2



## 21.7.5 Maintenance

### Test and Diagnostics

The terminal is equipped with a power-up self test.

After successful completion of the self test, a beep will send and a message will be displayed in the middle of the screen.

The self test diagnostic firmware includes:

- RAM test (read/write test at each location);
- ROM test (checksum comparison based on LRC calculation);
- NUR test (checksum comparison).

Self test failures are displayed in the following way:

- RAM failure;
- ROM failure;
- NUR error;
- Keyboard error.

To clear the display type:

ESC [J or enter-Set-Up mode; Clear display.

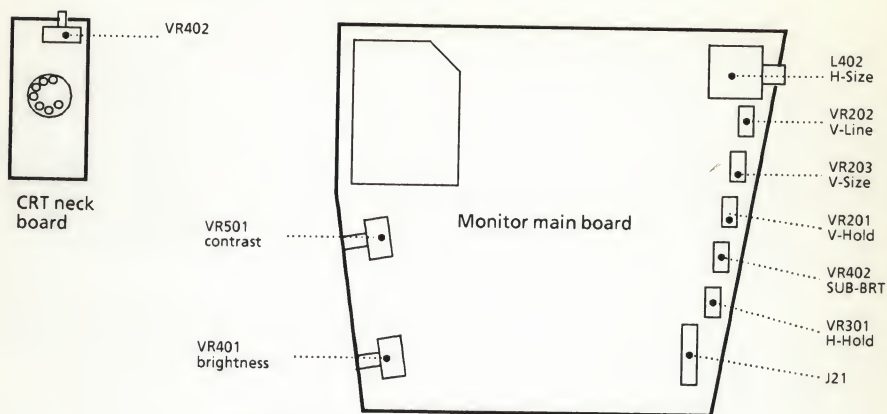
The following functions can be used when adjusting the monitor main board:

- Switch local each to 'on' in the Communications Set-Up menu;
- Press Set-Up to exit;
- Press ESC # 8 (in that order!) to fill the screen with capital letters E;
- Press ESC # 9 (in that order!) to fill the screen with character assortment;
- These displays can be used in either 80 or 132 character columns.



## Adjustments

### Monitor Main Board Video Controls



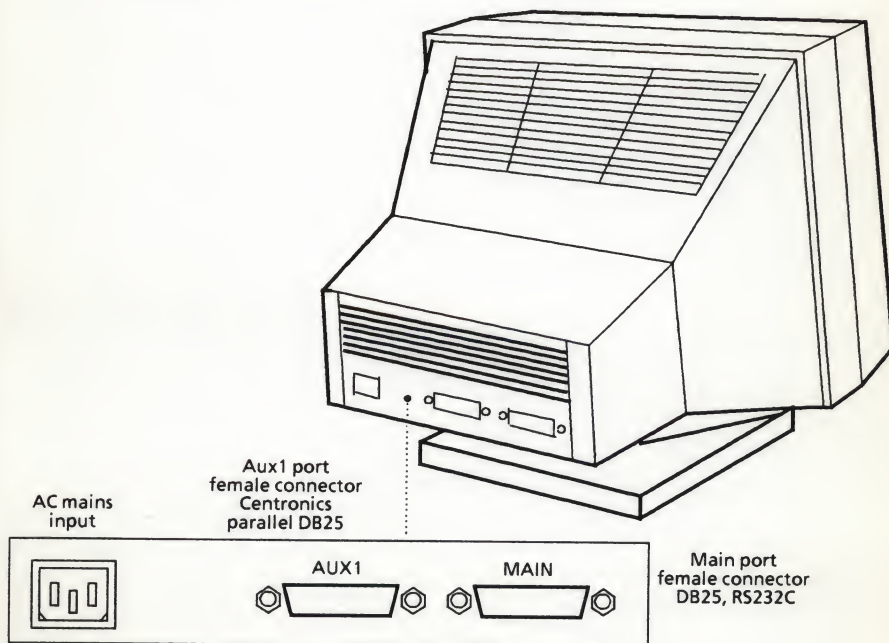
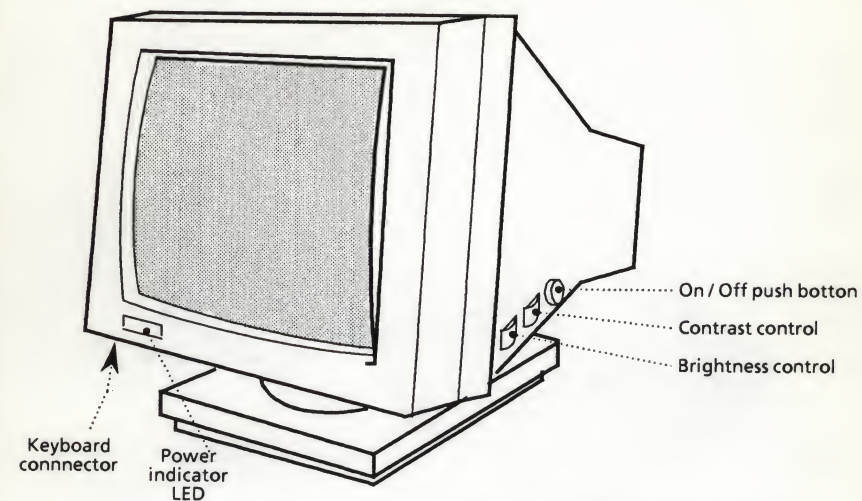
| CONTROL I.D. | FUNCTION           |
|--------------|--------------------|
| VR301        | Horizontal hold    |
| VR203        | Vertical size      |
| VR202        | Vertical linearity |
| VR601        | Focus              |
| VR402        | SUB-brightness     |
| VR401        | Brightness         |
| VR501        | Contrast           |
| L402         | Horizontal size    |
| VR201        | Vertical hold      |



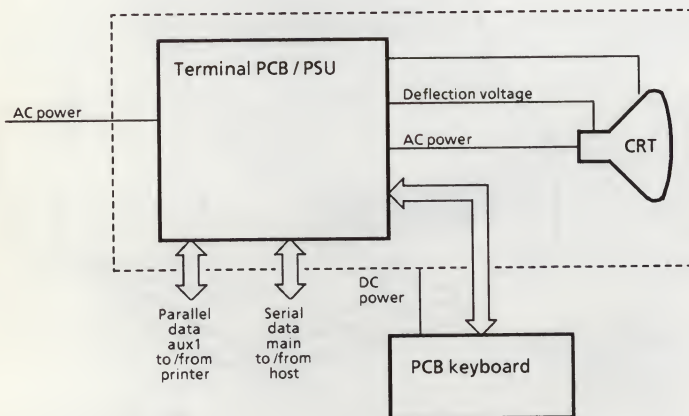
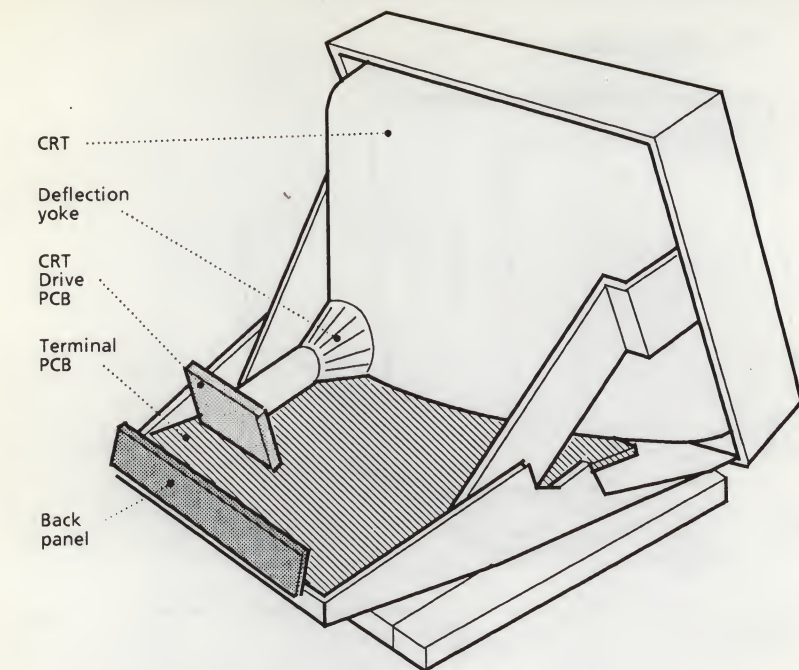
## 21.8 P2707 Wyse WY-120

The P2707 Wyse WY-120 is End Commercial Delivery

### 21.8.1 Characteristics

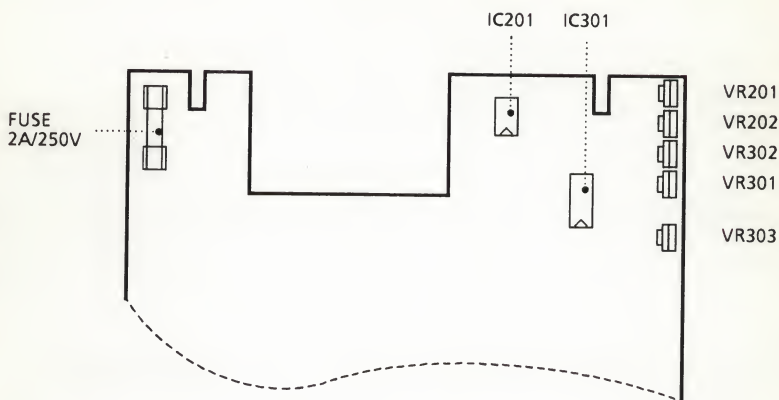


## 21.8.2 Connections



### 21.8.3 Strap Settings

No hardware strap setting for the power supply, since separate 120 Volt and 220V units must be ordered.



### Softstrapping of the terminal functions using the Set-Up screens.

There are in total 9 set-up screens.

Entering Set-Up mode, using an:

ANSI-KeyBoard, press: **SHIFT + Set-up (or Ctrl. + Set-up)**

PC-Style keyboard, press: **SHIFT + Select** (or **Ctrl. + Select**)

Each set-up screen has a number of fields.

All fields are shown in half tone, except the active field which is shown in full tone.

To move from one field to another field use the ARROW keys.

To view the next set-up screen, press the function key as shown at the bottom of the set-up screen.

Modifying parameters in a field can be done by pressing the spacebar.

Leaving the set-up mode can be done in two ways:

- Press F12 to exit and return to the main menu; pressing F12 again will cause leaving set-up mode without saving the changes.
- Press F12 to exit and return the main menu; pressing, the spacebar will toggle between 'save no' and 'save yes'; pressing the spacebar ('save yes') and F12 will cause having set-up mode and save the changes.



The most important settings are in communications set-up. (See figure below).

- Transmit baud rate : 9600
- Parity / word : 8 bits no parity
- Stop bit : 1 stop bit
- Transmit control : Limited
- Protocol : XOFF at 64
- Receive baud rate : Transmit
- Receive parity : No check
- DTR control : Normal

|                                                   |                                      |                                      |                                     |                                     |                                     |                                      |                                      |                                     |
|---------------------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|
| Setup<br>(F1 - F8 select menu; ESC sets defaults) |                                      |                                      |                                     |                                     |                                     |                                      | Save?<br>(SPACE toggles)             |                                     |
|                                                   |                                      |                                      |                                     |                                     |                                     |                                      | <input type="button" value="No"/>    |                                     |
| F1                                                | F2                                   | F3                                   | F4                                  | F5                                  | F6                                  | F7                                   | F8                                   | F12                                 |
| <input type="button" value="Disp"/>               | <input type="button" value="Genrl"/> | <input type="button" value="Keybd"/> | <input type="button" value="Comm"/> | <input type="button" value="Misc"/> | <input type="button" value="Tabs"/> | <input type="button" value="Ansbk"/> | <input type="button" value="Fkeys"/> | <input type="button" value="Exit"/> |

## 21.8.4 Installation

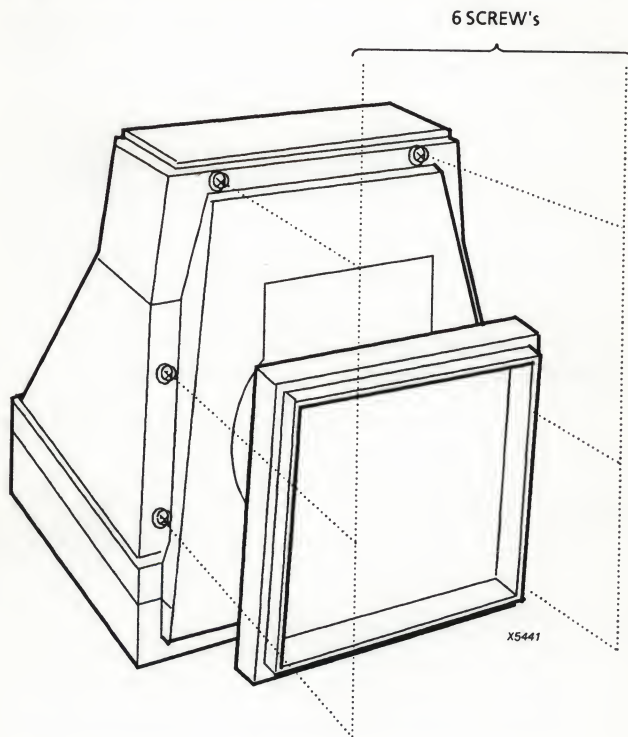
### Removal of the Terminal Enclosure

The removal and replacement procedures require the removal of the terminal enclosure.

- Switch off and disconnect the mains cable, disconnect the data connection and disconnect the keyboard.
- Turn over the terminal and rest the display face on a nonscratch surface.
- Remove the four Phillips screws from the bottom, gently press the operator control assembly inwards and pull the terminal cover off the unit.

### Replacement

- To replace the terminal enclosure reverse the procedure described above.



For other Removal / Replacements see WY-120 Maintenance Manual.

## 21.8.5 Maintenance

### Test and Diagnostics

The terminal is equipped with a power-on self test.

After the self test is completed and successful, a beep will sound and a line shows up on the top of the screen.

Above that line, the setting of the 'comm' variable from the communication set-up menu is displayed.

It is possible to run a terminal diagnostic self test.

This self test needs special test connectors on the main and auxiliary parts.

Loopback connector pin numbers and signals are as follows:

| LOOPBACK PORT           | PIN                                              | SIGNAL                                                         |
|-------------------------|--------------------------------------------------|----------------------------------------------------------------|
| MAIN                    | 2 - 3<br>4 - 5<br>8 - 20                         | TXD → RXD<br>RTS → CTS<br>DCD → DTR                            |
| AUX1<br>(Even Parallel) | 2 - 10<br>4 - 11<br>6 - 12<br>8 - 15<br>1-LED-17 | D0 → ACK<br>D2 → BUSY<br>D4 → PE<br>D6 → ERROR<br>STB → Ground |
| AUX1<br>(Odd Parallel)  | 3 - 10<br>5 - 11<br>7 - 12<br>9 - 15<br>1-LED-17 | D1 → ACK<br>D3 → BUSY<br>D5 → PE<br>D7 → ERROR<br>STB → Ground |

To start the diagnostic self test, switch the terminal on with the loopback connectors on the two parts. (Use 'Even Parallel' or 'Odd Parallel' on AUX1).

To fully test the terminal, let the diagnostic self test run five minutes.

If the test stops, the terminal beeps and a error code in the form of a letter or number will appear on the screen.

| CODE | FAILURE MESSAGE        | LOCATION   |
|------|------------------------|------------|
| 0    | Character RAM Chip     | U3         |
| 1    | Attribute RAM Chip     | U9         |
| 2    | Font RAM               | U2         |
| P    | Code PROM Checksum     | U5         |
| K    | Set-up Lost (Battery)  | BATT1      |
| d    | AUX1 Port D0, D1-ACK   | U11 or U12 |
| b    | AUX1 Port D2, D3-BUSY  | U11 or U12 |
| C    | AUX1 Port D4, D5-PE    | U11 or U12 |
| a    | AUX1 Port D6, D7-ERROR | U11 or U12 |
| A    | MAIN Port RTS-CTS      | U10 or U7  |
| c    | MAIN Port DTR-DCD      | U10 or U7  |
| X    | MAIN Port TxD-RxD      | U10 or U7  |

If the test is completed successfully, turn the terminal off, reverse the test connectors, reattach the communication cables and switch on the terminal.

## Trouble shooting Quick Reference Guide

Possible Problem Area

| Symptom                      | Terminal PCB | CRT / Yoke | Keyb. Cable | Setup Param. | Comm. Cable | Adjustment | Test Conn. |
|------------------------------|--------------|------------|-------------|--------------|-------------|------------|------------|
| No video                     | ■            | ■          |             |              |             | ■          |            |
| Poor display                 | ■            |            |             |              |             | ■          |            |
| Fails diagnostic test        | ■            |            |             |              |             |            | ■          |
| No keyboard response         | ■            |            | ■           | ■            | ■           |            |            |
| Communication problems /host | ■            |            |             | ■            | ■           |            |            |

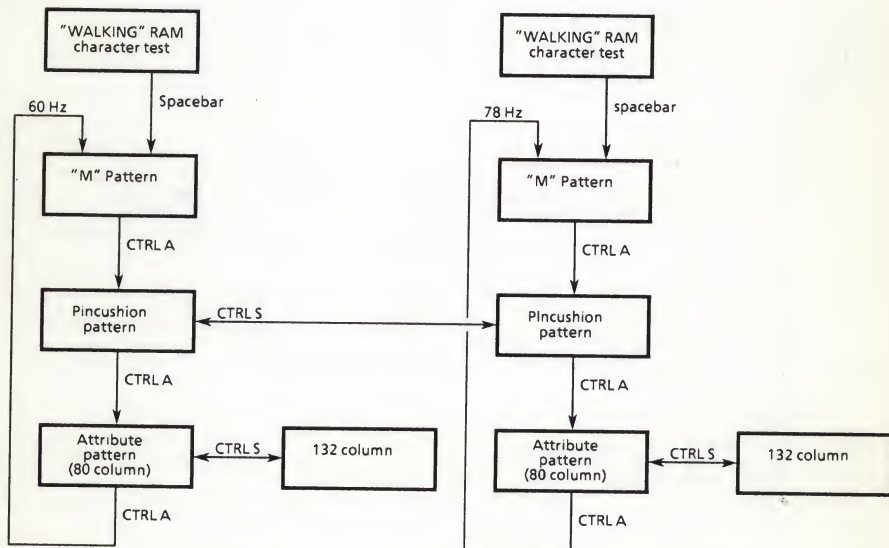
Setting test patterns for adjusting and aligning the terminal.

Attach the loopback connectors to the MAIN and AUX1 ('even parallel') ports, and switch on the terminal.

It is advised to let the terminal run for 30 minutes to ensure display stability and to prevent distortion.

The test pattern sequence for both 60 Hz and 78 Hz modes is as follows:

### SELF TEST

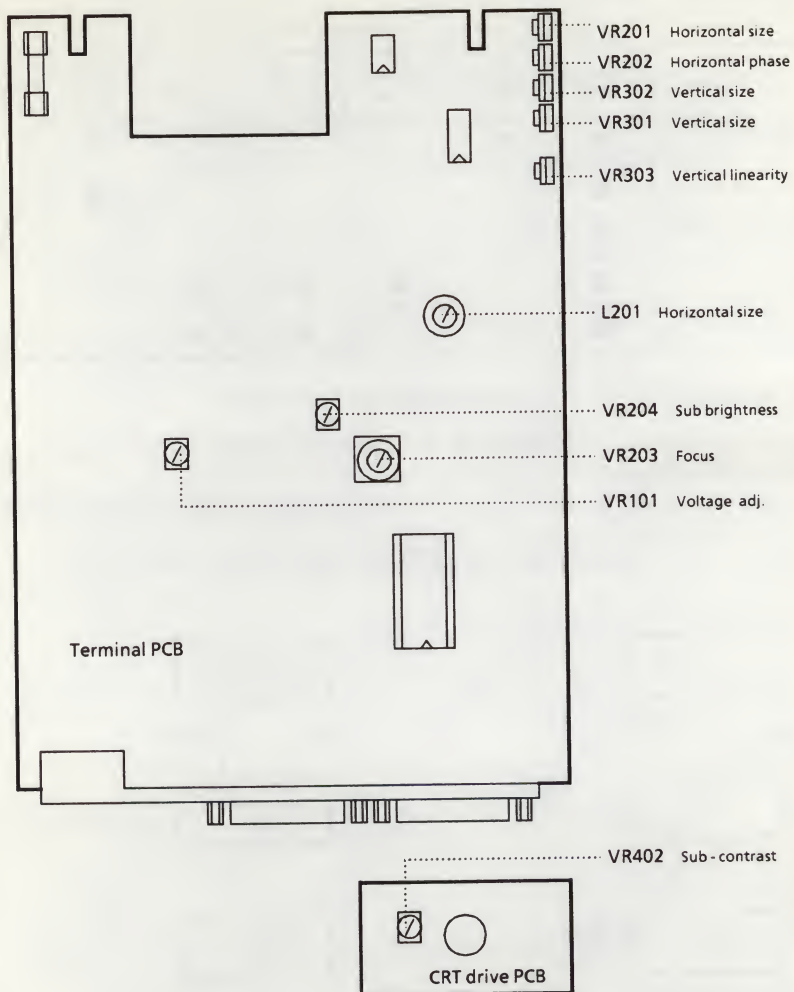


Pressing ENTER will cause a return to the "walking" RAM character test screen.



## Adjustments

### Terminal PCB

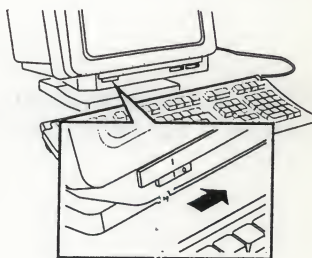
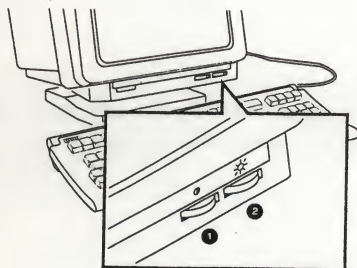
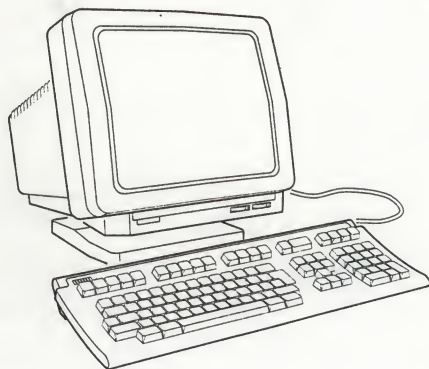




## 21.9 DEC VT420

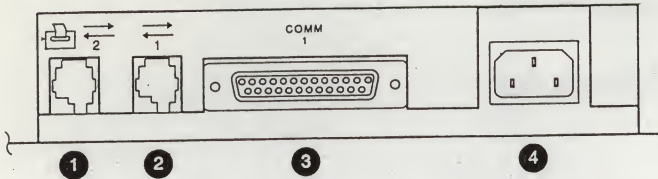
This section only describes the basics of the DEC VT420. More information can be found in the VT420 Installation and User Guide (Part Nr.: EF-VT420-UU.001), which is delivered with every terminal.

### 21.9.1 Characteristics



- ① Contrast control    ② Brightness control

## 21.9.2 Connections



GSF\_0620\_89.DG

|   | Port | Connector            | Function                                                                                                              |
|---|------|----------------------|-----------------------------------------------------------------------------------------------------------------------|
| ① |      | Comm2 6-pin, DEC-423 | Connects the terminal to a printer or a secondary host computer, directly or indirectly (through a terminal server).  |
| ② |      | Comm1 6-pin, DEC-423 | Connects the terminal to a <i>primary host</i> computer, directly or indirectly (through a terminal server or modem). |
| ③ |      | Comm1 25-pin, RS-232 | Connects the terminal to a <i>primary host</i> computer, directly or indirectly (through a terminal server or modem). |
| ④ |      | Power IEC            |                                                                                                                       |

The VT420 Offers the possibility to set up a dual terminal session. How this session can be set up, see the VT420 Installing and Using Guide, delivered with every terminal.

### 21.9.3 Strap Setting

The VT420 is equipped with softstrapping, which can be altered via Set-Up Menu's. To enter the first set-up menu (Set-Up Directory) press **[F3]** ([Alt] + [SetUp] for PC KB). The Set-Up Directory screen appears. With the arrow keys and [Enter] further selection can be made. The most important settings are in Communications set-up.

| Set-Up Directory                                                      |                                           | VT420 V2.0 |
|-----------------------------------------------------------------------|-------------------------------------------|------------|
| <b>Global</b>                                                         | Display General Comm Printer Keyboard Tab |            |
| Clear Display Clear Comm Reset Session Recall Save                    |                                           |            |
| Set-Up=English North American Keyboard Default                        |                                           |            |
| Enable Sessions Disable Sessions Exit Screen Align                    |                                           |            |
| Copyright © 1991, Digital Equipment Corporation - All Rights Reserved |                                           |            |
| <b>1 (002.003)</b> Printer: Ready Modem: DSR                          |                                           |            |
| Session 1                                                             |                                           |            |

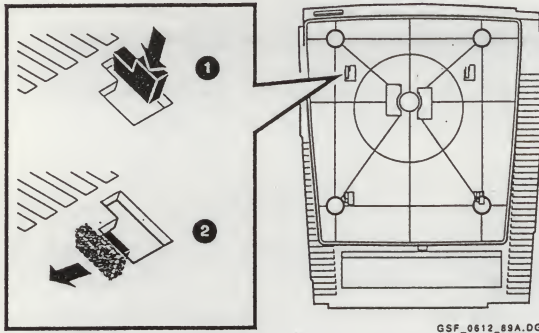
| Communications Set-Up Comm1                            |                                               | VT420 V2.0 |
|--------------------------------------------------------|-----------------------------------------------|------------|
| <b>To Next Set-Up</b>                                  | To Directory Transmit = 9600 Receive=Transmit |            |
| XOFF at 64 8 Bits, No Parity 1 Stop Bit No Local Echo  |                                               |            |
| Data Leads Only Disconnect, 2 s Delay Limited Transmit |                                               |            |
| No Auto Answerback Answerback= Not Concealed.          |                                               |            |
| Modem High Speed = Ignore Modem Low Speed = Ignore     |                                               |            |
| <b>1 (002.003)</b> Printer: Ready Modem: DSR           |                                               |            |
| Session 1                                              |                                               |            |

For further explanation see the Installation and User manual of the DEC VT420 Video Terminal.

## 21.9.4 Installation

When installing a new VT420 Video Terminal, the tilt-swivel base must be installed on the terminal. To do so, follow the steps described below:

- Place the terminal upside down on a flat level surface.
- Position the tilt ball over the terminal so the four tabs on the ball align with the holes on the bottom of the terminal.
- Place the tabs in the holes.
- Slide the tilt-swivel assembly to the left, until the assembly snaps into place.



For more detailed information, see the installation/user manual of the VT420 video terminal.

## 21.9.5 Maintenance

### Test and Diagnostics

The terminal is equipped with a power-on self test. During the test, some test patterns will be displayed on the screen. After the self test is completed and successful, a beep will sound and the test will report with VT420 OK.

## **21.9.5 Maintenance**

### **Test and Diagnostics**

The terminal is equipped with a power-on self test.

After the self test is completed and successful, a beep will sound and a line shows up on the top of the screen.





## 24 INTELLIGENT WORKSTATIONS

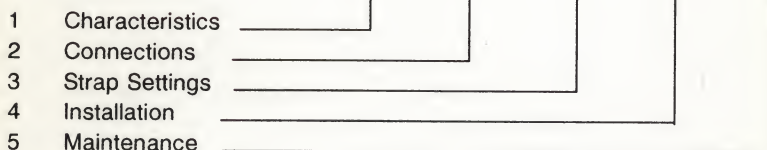
Section:

Page:

|                   |        |
|-------------------|--------|
| 1: Technical Data | 24.1-1 |
|-------------------|--------|

|                                                 |        |        |        |        |         |
|-------------------------------------------------|--------|--------|--------|--------|---------|
| 2: Personal Computer                            | 24.2-1 | 24.2-1 | 24.2-3 | 24.2-4 | 24.2-8  |
| 3: NCD14C X-Terminal<br>14 inch colour          | 24.3-1 | 24.3-1 | 24.3-1 | 24.3-1 | 24.3-2  |
| 4: NCD15b X-Terminal<br>15 inch black and white | 24.4-1 | 24.4-1 | 24.4-1 | 24.4-1 | 24.4-2  |
| 5: NCD17C X-Terminal<br>17 inch colour          | 24.5-1 | 24.5-1 | 24.5-1 | 24.5-1 | 24.5-1  |
| 6: NCD19 X-Terminal<br>19 inch black and white  | 24.6-1 | 24.6-2 | 24.6-3 | 24.6-7 | 24.6-11 |

Subsection:



**NOTE:** *n.a. means that this section is not available for this unit.*



## 24.1 TECHNICAL DATA

|                                    | PC   | NCD14C                            | NCD15b                            | NCD17C                            | NCD19                             |
|------------------------------------|------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Display size                       | n.a. | 14"                               | 15"                               | 17"                               | 19"                               |
| Resolution                         | n.a. | 100DPI                            | 100DPI                            | 85DPI                             | 100DPI                            |
| Addressability                     | n.a. | 1024x768                          | 1024x800                          | 1024x768                          | 1280x1024                         |
| Refresh rate                       | n.a. | 70Hz                              | 70Hz                              | 70Hz                              | 70Hz                              |
| Nr. of colours                     | n.a. | 256                               | 1                                 | 256                               | 1                                 |
| Main Processor                     | n.a. | 68020, 20Mc                       | 68000, 16Mc                       | 68020, 20Mc                       | 68020, 15Mc                       |
| System memory *                    | n.a. | 2,4,5,8,16,17,<br>20 or 32Mb      | 2 or 5Mb                          | 2,4,5 or 8Mb                      | 2,4,5 or 8Mb                      |
| Interfaces                         | n.a. | 10BASE2,<br>10BASE5 and<br>RS232C | 10BASE2,<br>10BASE5 and<br>RS232C | 10BASE2,<br>10BASE5 and<br>RS232C | 10BASE2,<br>10BASE5 and<br>RS232C |
| Power supply                       | n.a. | 220/110V<br>autosensing           | 220/110V<br>auto sensing          | 220/110V<br>auto sensing          | 220/110V<br>switchable            |
| Input power                        | n.a. | 2.5A, 115 vac                     | 2.0A, 115 vac                     | 3A, 115 vac                       | 2.5A, 115 vac                     |
| Heat dissipation                   | n.a. | 512 btu                           | 342 btu                           | 512 btu                           | 342 btu                           |
| Temperature<br>tolerance operating | n.a. | 10 to 40 °C                       | 10 to 40 °C                       | 10 to 40 °C                       | 10 to 40 °C                       |

Note: \* The memory sizes listed above are technically possible sizes, this does not mean also supported. Supported is 4Mb and 8Mb.





## 24.2 Personal Computer

For installation of a Personal Computer, refer to the appropriate CE-manual.

### 24.2.1 Characteristics

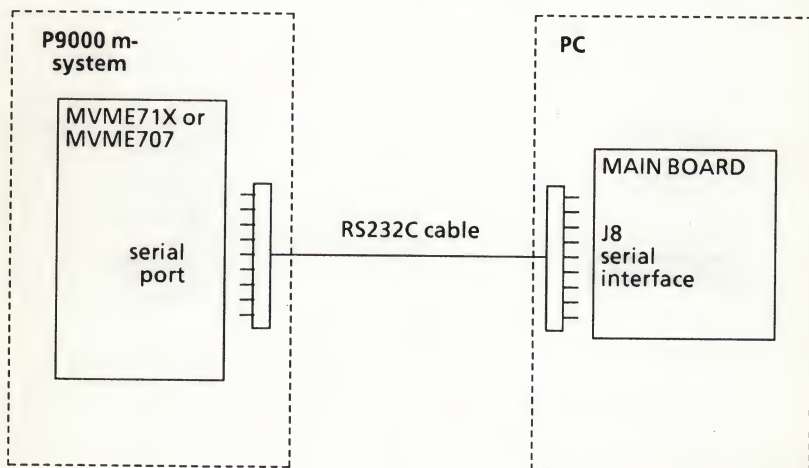
The facilities for a Personal Computer in a P9000 m-system are merely software dependent. The software packages used to establish the connection via ethernet or RS232C link between a P9000 m-system and a PC are **PC-Interface** and **PC-Interconnect**.

**PC-Interface** supports an ethernet and RS232C link, for establishing the ethernet connection a MVME330A must be installed at the P9000 m-system side and a 3COM Etherlink (model 3C501) at the PC side. **PC-Interconnect** supports only a RS232C link. For establishing the RS232C link only a free serial asynchronous port is needed. (On a MVME332, MVME332xt, MVME335, SYS336 (server) or Processor board). At the P9000 m-system side and an asynchronous serial port at the PC side (COM1).

### 24.2.2 Connecting the Personal Computer

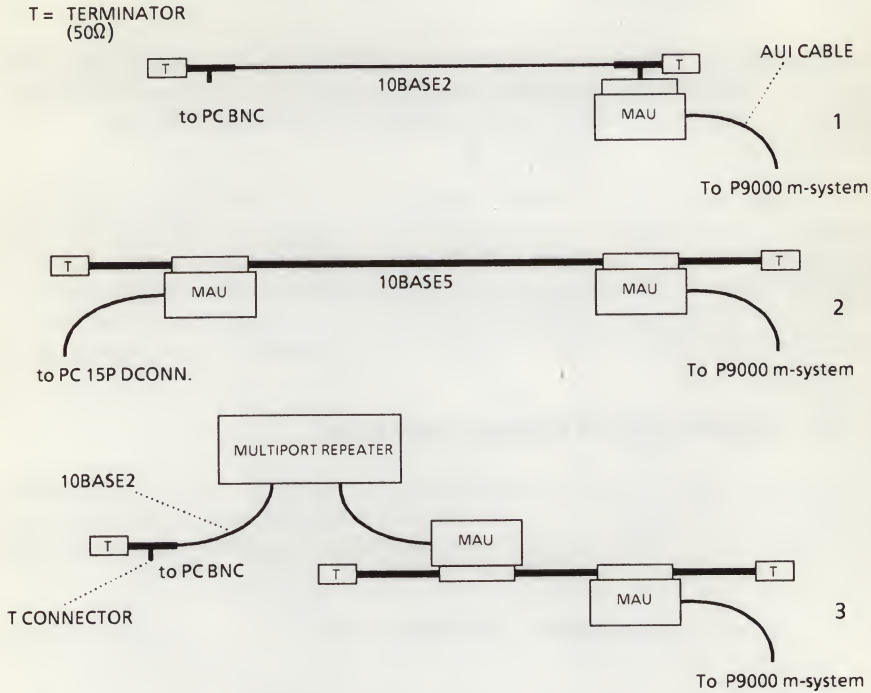
PC-Interface supports the connection of a PC to a P9000 m-system via a ethernet and a RS232C link, tm220 terminal emulation is only supported via ethernet. (Only vt100 on a RS232C link). PC-Interconnect however does support tm220 emulation on a RS232C link.

Connecting the Personal Computer via a **RS232C link**.



# Connecting the Personal Computer via an **Ethernet link**.

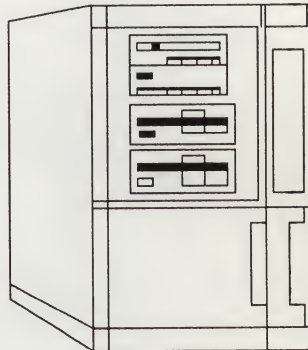
There are three possible ethernet configurations, drawn in the figure. A 10BASE2 (1), 10BASE5 (2) and a combined configuration (3).



PC with 3c501 Etherlink Board



P9000 m-system with an MVME330A

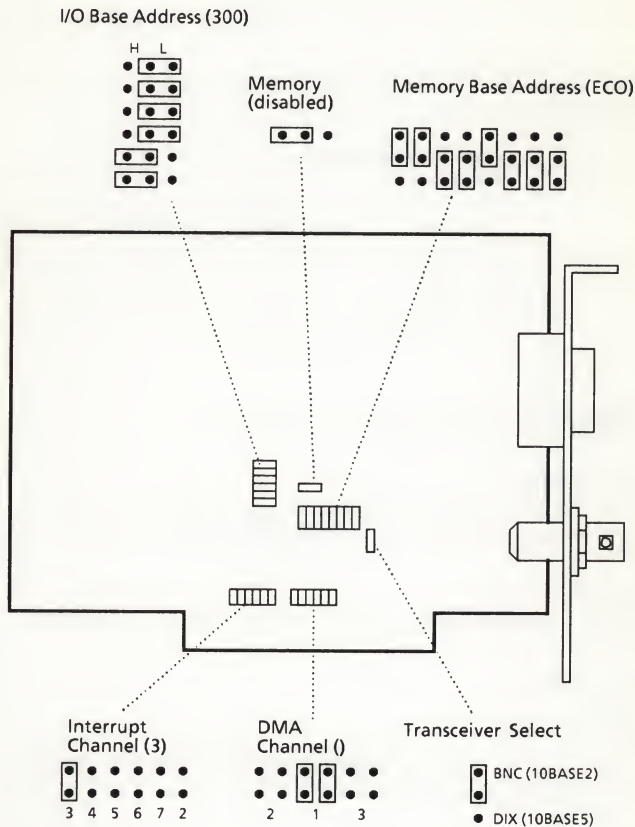


3 possible ethernet configurations

### 24.2.3 Strap Settings

For the strap setting of the MVME330A see section 15 of this manual.

Strap setting of the 3COM Etherlink board.



Strap setting of the Asynchronous Serial port of the PC.

Check if your Personal computer is strapped as a DTE.

Soft straps Personal Computer :

- comm. port 1
- baudrate 9600
- parity no
- data bits 8
- stop bits 1

Command: mode com1:96,n8,1

For more information about strap settings of a Personal Computer, refer to the appropriate CE-manual.

**NOTE:** For detailed information about the strap setting of the 3C501 Etherlink board see the with the board delivered Installation Guide.

Straps on the MVME71X (or MVME707) serial transition board: (RS232C link).

The transition module must be strapped like a DTE if a crossed cable is used, for other possibilities see table below.

| P90X0 SIDE | PC SIDE | CABLE    |
|------------|---------|----------|
| DTE        | DTE     | crossed  |
| DTE        | DCE     | straight |
| DCE        | DTE     | straight |
| DCE        | DCE     | crossed  |

relationship cable vs. interfaces

## 24.2.4 Installation Intelligent Workstations

### Hardware Installation

For installation of a Personal Computer, refer to the appropriate CE-manual. For connecting the Personal Computer to the P9000 m-system, see chapter 24.2.2

### Software Installation

See the **software release guides**, for proper installation procedure.

### Post-Install Tests

#### PC-Interface

The Post-Install Test checks the functionality of the installed network and the software loaded on the P9000 m-system and the PC's.

The procedure includes logging on to a remote P9000 m-system and accessing the virtual disk from the PC.

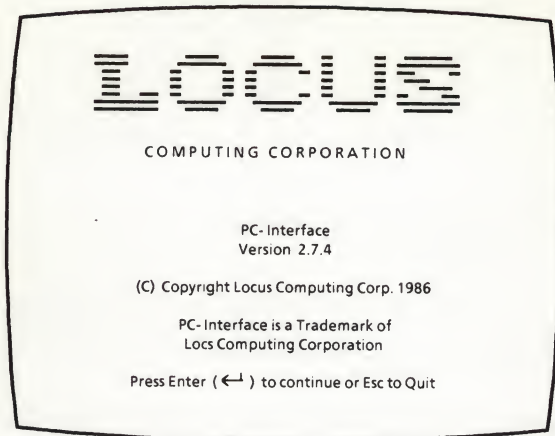
1. Personal Computers with a fixed disk:
  - Boot PC by switching it on or by holding down the **CTRL** and **ALT** keys, and pressing the **DEL** key.  
DOS returns with the C> prompt
- 2./3. Personal Computers without fixed disk:
  - Insert PC-Interface WORKING diskette in drive A; and boot PC by switching it on or by holding down the **CTRL** and **ALT** keys, and pressing the **DEL** key DOS returns the A> prompt.



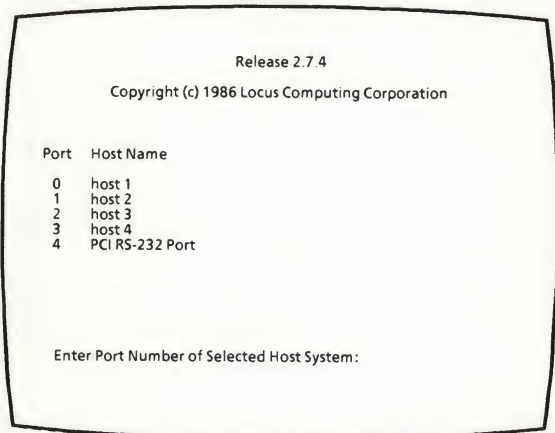
For all Personal Computers:

- Type **login <CR>**

The PC-Interface logo should appear:



- Press **<CR>** to continue to the Host Menu
- The Host Screen can appear as follows:



- In response to the host-selection prompt, type the port number that appears on the menu for the PCI-RS232 Port: **4 <CR>**
- The following prompt replaces the host-selection prompt:  
Enter Baud Rate (300,1200,2400,480,9600):  
type **9600 <CR>**



PC-Interface prompts you to log in to your UNIX-host. A five-line window appears at the bottom of your screen in which the UNIX-host identifies itself and prompts you for your user name and password.

If the window remains blank, try pressing **<CR>** again. If the screen is still blank, the automatic baud rate of the host may not match the baud rate you selected. To change the host baud rate, press the **F1**-function key repeatedly until the host identification appears.

When you have successfully logged in, you receive the UNIX prompt.

- Press function key **F9**.

The window disappears and the following message is displayed:  
Connection Attempt is Progress

- When the connection is established, the following message appears on your screen:  
Welcome to PC-Interface.  
Unix File System Available as Drive C:

DOS returns with prompt, namely **A>** for systems without fixed disk, and **C>** for systems with a fixed disk.

**NOTE:** *The drive specifier you see might be different. For example, if your personal computer has a fixed disk, the drive specifier for the UNIX file system is typically **D:**, instead of **C:**. PC-Interface uses the next available drive specifier supplied by DOS. In the examples here, references to drive **C:** means the drive specified for the UNIX file system.*

1. For systems with a fixed disk:

- To view the available files on the P9000m, type **C>D: <CR>**  
**D>dir <CR>**

The contents of the directory of the P9000m will be displayed.

- You can switch back and forth, using either the 'C' or 'D' drive. Just type **D:** at the **C>** prompt or **C:** at the **D>** prompt.

**D>C: <CR>**

to switch back to C-drive and DOS

**C>D: <CR>**

to switch from DOS to D-drive and  
P9000m

- To disconnect and end the session, type **logout** at the **A>** prompt

- 2./3. For systems without a fixed disk:

- To view the available files on the P9000m, type **A>C: <CR>**  
**C>dir <CR>**

The contents of the directory of the P9000m will be displayed.

- You can switch back and forth, using either the 'A' or 'C' drive. Just type **C:** at the **A>** prompt or **A:** at the **C>** prompt.

**C>A: <CR>**

to switch back to A-drive and DOS

a>**C: <CR>**

to switch from DOS to C-drive and  
P9000m

- To disconnect and end the session, type **logout** at the A> prompt

## PC220 Terminal Emulation Installation (Via Ethernet)

To install the PC220 emulation follow the steps described below.

- PC-Interface must be installed on the P9000m and the PC. It must be running on the P9000m.
- Begin a PC-Interface file services session by executing the command: Login at the PC.
- Change to the DOS drive on which you want to install the PC220 terminal emulator.
- Change the directory in which you want to install the PC220.EXE file. It is handy to install this file in the root directory.
- Change to the PC-Interface virtual drive by typing ; D : <RETURN>
- Enter the following command: \usr\pci\dos\pc22inst c: path h:

c: drive in which PC220 must be installed

path is the full path name of the directory in which  
the PC220 support files must be installed  
(example\ for root directory)

h: is the drive from which the PC is normally  
booted (usually h and c are the same, often h  
and c are drive c)

Start PC220 by typing pc220.

**NOTE:** PC220 emulation will only work via an ethernet link.

### PC-Interconnect

Type at the DOS prompt: pci -m

After a few seconds the PC-Interconnect main menu will appear, now type F2 to start terminal emulation, default tm220 emulation (9600 b/sec, 8 bits, 1 stop bit, no parity). If there is a proper connection (RS2321C) to the P9000m and the port is respawning the UNIX login prompt should appear.

To return to the main menu type **ALT F10**.

To return to DOS type from the main menu F9 and answer Yes on the question "Do you want to return to DOS?".

## 24.2.5 Maintenance

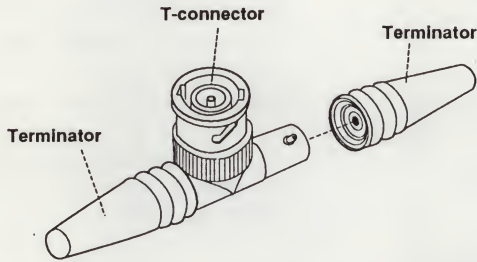
### Test and Diagnostics

The 3COM 3C501 Etherlink board will be accompanied by a diagnostic floppy. To test the board, you need a loop back plug, which is a T connector which is terminated at both sides (50 Ohm 10BASE2 terminator).

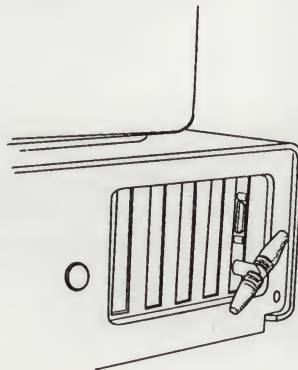
The tests can be started by starting up the command **3C501 L**, which is on the diagnostic floppy. For more detailed information about this tests see the 3C501 Installation Guide.

If the tests fail check the strap setting of the board and check if the loopback connector is present.

For Test and Diagnostics on the MVME330A see section 15.2.6.



**Assembling a Loopback Plug**



**Attaching the Loopback Plug**

## 24.3 NCD14C X-Terminal 14 inch colour

### 24.3.1 Characteristics

See section 24.6.1 (NCD19)

### 24.3.2 Connections

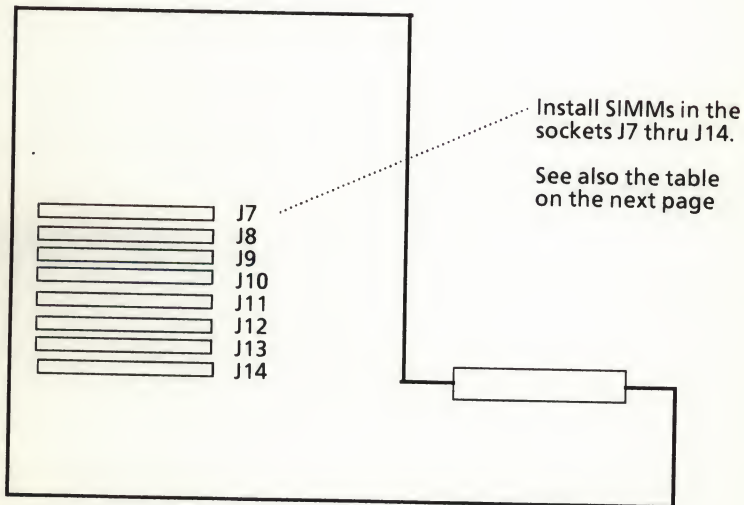
See section 24.6.2 (NCD19)

### 24.3.3 Strap Settings

See section 24.6.3 (NCD19)

### 24.3.4 Installation

Installation is as described in section 24.3.4 except for the memory configuration. The memory configuration for the NCD14C is shown in the figure below.





| Socket | 2 Mb   | 4 Mb | 5 Mb   | 8 Mb | 16 Mb | 17 Mb  | 20 Mb | 32 Mb |
|--------|--------|------|--------|------|-------|--------|-------|-------|
| J7     | 256 Kb |      | 256 Kb | 1 Mb |       | 256 Kb | 1 Mb  | 4 Mb  |
| J8     | 256 Kb | 1 Mb | 1 Mb   | 1 Mb | 4 Mb  | 4 Mb   | 4 Mb  | 4 Mb  |
| J9     | 256 Kb |      | 256 Kb | 1 Mb |       | 256 Kb | 1 Mb  | 4 Mb  |
| J10    | 256 Kb | 1Mb  | 1 Mb   | 1 Mb | 4 Mb  | 4 Mb   | 4 Mb  | 4 Mb  |
| J11    | 256 Kb |      | 256 Kb | 1 Mb |       | 256 Kb | 1 Mb  | 4 Mb  |
| J12    | 256 Kb | 1 Mb | 1 Mb   | 1 Mb | 4 Mb  | 4 Mb   | 4 Mb  | 4 Mb  |
| J13    | 256 Kb |      | 256 Kb | 1 Mb |       | 256 Kb | 1 Mb  | 4 Mb  |
| J14    | 256 Kb | 1Mb  | 1 Mb   | 1 Mb | 4 Mb  | 4 Mb   | 4 Mb  | 4 Mb  |

### 24.3.5 Maintenance

For the maintenance, see section 26.6.5 (NCD19).



## 24.4 NCD15b X-Terminal 15 inch black and white

### 24.4.1 Characteristics

See Section 24.6.1 (NCD19)

### 24.4.2 Connections

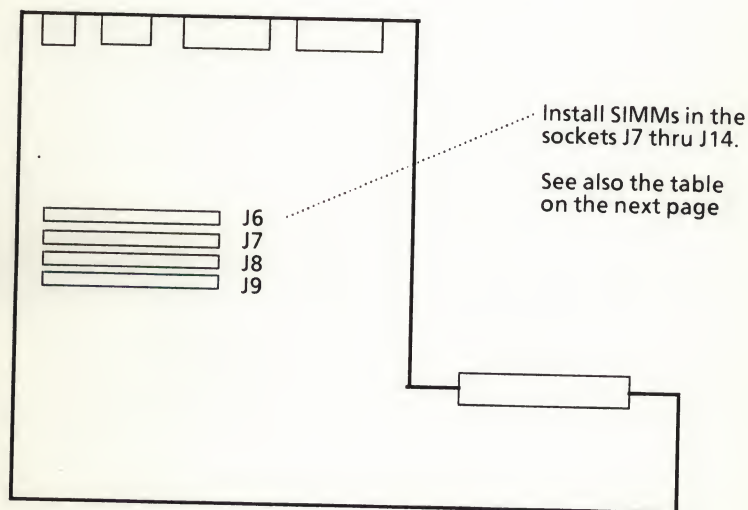
See Section 24.6.2 (NCD19)

### 24.4.3 Strap Settings

See Section 24.6.3 (NCD19)

### 24.4.4 Installation

Installation is as described in section 24.6.4 except for memory configuration. The memory configuration for the NCD15 is shown in the figure below.



| Socket | 1 Mb | 2 Mb   | 5 Mb |
|--------|------|--------|------|
| J6     | *    | 256 Kb | 1 Mb |
| J7     | *    | 256 Kb | 1 Mb |
| J8     | *    | 256 Kb | 1 Mb |
| J9     | *    | 256 Kb | 1 Mb |

\* The memory chips for the first 1Mb are on the Main PCB.

### 24.4.5 Maintenance

For the maintenance, see section 24.6.5 (NCD19)

## 24.5 NCD17C X-Terminal 17 inch colour

### 24.5.1 Characteristics

See section 24.6.1 (NCD19)

### 24.5.2 Connections

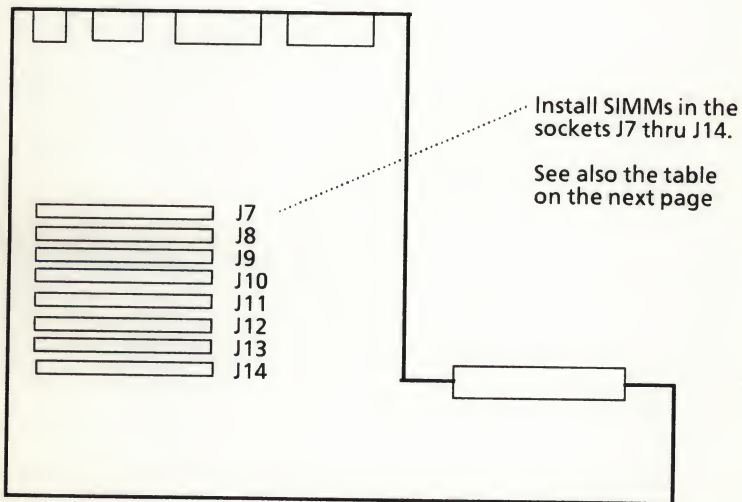
See section 24.6.2 (NCD19)

### 24.5.3 Strap Settings

See section 24.6.3 (NCD19)

### 24.5.4 Installation

Installation is as described in section 24.6.4 except for memory configuration. The memory configuration for the NCD17C is shown in the figure below.



| Socket | 2 Mb   | 4 Mb | 5 Mb   | 8 Mb |
|--------|--------|------|--------|------|
| J7     | 256 Kb |      | 256 Kb | 1 Mb |
| J8     | 256 Kb | 1 Mb | 1 Mb   | 1 Mb |
| J9     | 256 Kb |      | 256 Kb | 1 Mb |
| J10    | 256 Kb | 1Mb  | 1 Mb   | 1 Mb |
| J11    | 256 Kb |      | 256 Kb | 1 Mb |
| J12    | 256 Kb | 1 Mb | 1 Mb   | 1 Mb |
| J13    | 256 Kb |      | 256 Kb | 1 Mb |
| J14    | 256 Kb | 1Mb  | 1 Mb   | 1 Mb |

### 24.5.5 Maintenance

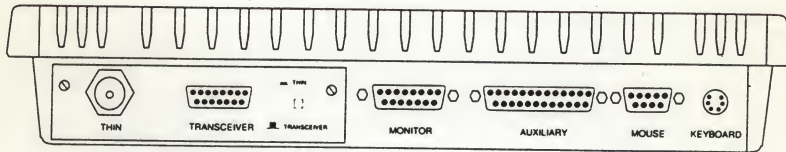
See section 24.6.5 (NCD19).

## 24.6 NCD19 X-Terminal 19 Inch black and white

### 24.6.1 Characteristics

For the technical data, see section 24.1.

### 24.6.2 Connections



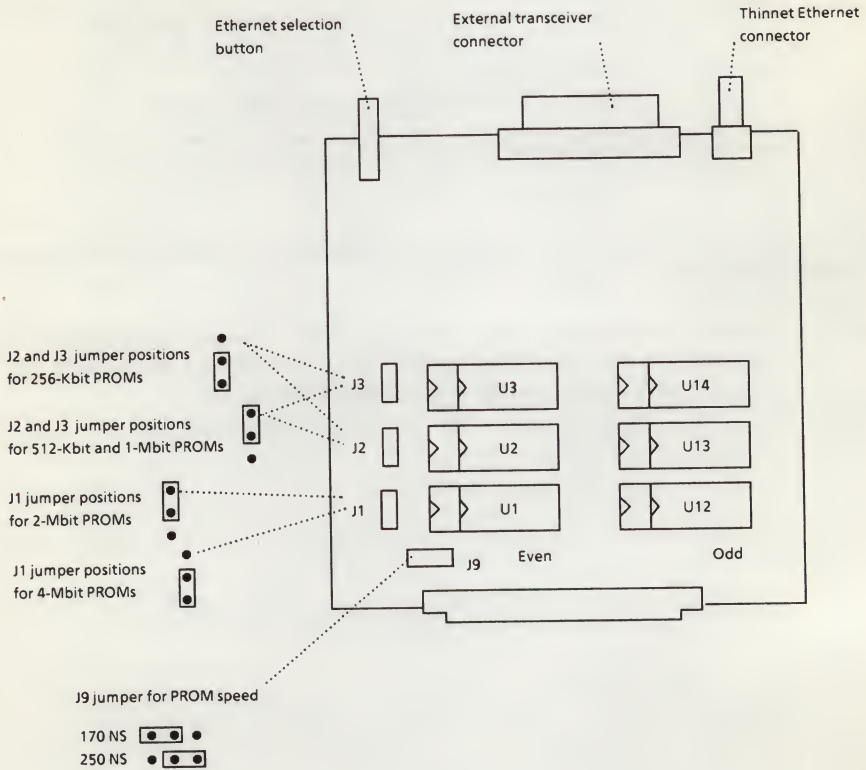
The display monitor, keyboard, and mouse all connect to the display station base via connectors located on the rear panel of the base.

**NOTE:** Do not connect the power cord to the NCD X-terminal unless the monitor, keyboard, and mouse cables are all connected. Do not disconnect any of these cables when the NCD X-terminal is powered on.




### 24.6.3 Strap Settings

There are only "hardware" straps on the communications module, which can be removed from the display station.



## Soft Strapping:

The NCD X-terminals have a menu driven setup utility to setup the X-terminal. Before this "Setup" menus can be entered, the X-terminal must have been booted. X-terminals can be booted in 2 ways; booted from PROM via the bp command (boot PROMs must be installed) or from the network via the bt command. When a terminal is booted, and the setup key is pressed the following menu will be displayed.

| Main Menu                                                                                                                                                                               |                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>Session Menu</b>                                                                                                                                                                     | <b>Configuration Menu</b>                          |
| <input type="button" value="Telnet Session"/>                                                          | <input type="button" value="X Server Parameters"/> |
| <input type="button" value="Serial Session"/>                                                                                                                                           | <input type="button" value="Network Parameters"/>  |
| <input type="button" value="Diagnostic Session"/>                                                                                                                                       | <input type="button" value="Protocol Parameters"/> |
| <input type="button" value="Cterm Session"/>                                                                                                                                            | <input type="button" value="Serial Parameters"/>   |
| <b>Local Clients</b>                                                                                                                                                                    | <input type="button" value="Utilities"/>           |
| <input type="button" value="Telnet Client"/>                                                                                                                                            | <input type="button" value="Licensed Features"/>   |
| <input type="button" value="Serial Client"/>                                                                                                                                            | <b>Information Menu</b>                            |
| <input type="button" value="LAT Manager"/>                                                                                                                                              | <input type="button" value="Access Control List"/> |
| <b>User Preferences</b>                                                                                                                                                                 | <input type="button" value="Network Statistics"/>  |
| Overscan <input type="button" value="White"/>                                                                                                                                           | <input type="button" value="TCP/IP Statistics"/>   |
| Background <input type="button" value="White"/>                                                                                                                                         | <input type="button" value="ARP Table"/>           |
| Use Led 1 for <input type="button" value="Network Activity"/>                                                                                                                           | <input type="button" value="NFS Mount Table"/>     |
| Use Led 2 for <input type="button" value="Caps Lock"/>                                                                                                                                  | <input type="button" value="NCDnet Statistics"/>   |
| Use Led 3 for <input type="button" value="Num Lock"/>                                                                                                                                   | <input type="button" value="NCDnet Name Table"/>   |
|                                                                                                                                                                                         | <input type="button" value="LAT Groups"/>          |
| <input type="button" value="Save Power-On Values"/> <input type="button" value="Read Power-On Values"/> <input type="button" value="Reset Server"/> <input type="button" value="Done"/> |                                                    |

For first time setting up of an X-terminal, select now with the mouse the "X Server Parameters" in the configuration menus

Set the parameters to the values which are valid for your local situation, continue with the "Network Parameters Menu"

| X Server Parameters                                                                                                                            |                                                 |                        |                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------|--------------------------------------------|
| Retain X Settings                                                                                                                              | <input type="button" value="Yes"/>              | Permit Old X Bugs      | <input type="button" value="Yes"/>         |
| Backing Store                                                                                                                                  | <input type="button" value="By Request"/>       | Disable Error Popup    | <input type="button" value="No"/>          |
| Keyboard Type                                                                                                                                  | <input type="button" value="N-97"/>             | Virt. Term. at Reset   | <input type="button" value="XDM"/>         |
| DW Compatibility                                                                                                                               | <input type="button" value="Yes"/>              | Font Diagnostics       | <input type="button" value="No"/>          |
| Diagnostics Logging                                                                                                                            | <input type="button" value="Yes"/>              |                        |                                            |
| Diag. Log file name                                                                                                                            | <input type="text" value="/u18/mkm/.diag.log"/> |                        |                                            |
| XDM Parameters                                                                                                                                 |                                                 |                        |                                            |
| Display Manager access                                                                                                                         | <input type="button" value="Direct"/>           | Display Manager Server | <input type="text" value="192.43.153.12"/> |
| Dead session detection                                                                                                                         | <input type="button" value="On"/>               | Hibernation time (min) | <input type="text" value="3"/>             |
| Wait for last client                                                                                                                           | <input type="button" value="Off"/>              | Death timeout (sec)    | <input type="text" value="30"/>            |
| Action on failure                                                                                                                              | <input type="button" value="Persist"/>          |                        |                                            |
| <input type="button" value="Restart Session"/>                                                                                                 |                                                 |                        |                                            |
| <input type="button" value="Load Previous Values"/> <input type="button" value="Network Parameters"/> <input type="button" value="Main Menu"/> |                                                 |                        |                                            |

Now set the network parameters to the for your local situation correct values, continue with the "Protocol Parameters Menu".

| Network Parameters                                                                                                                              |                                                |                                           |                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------|--------------------------------------------|
| Active Ethernet Address 00:00:A7:00:17:DE                                                                                                       |                                                | Static Ethernet Address 00:00:A7:00:17:DE |                                            |
| Server Code                                                                                                                                     | <input type="button" value="From TCP/IP Net"/> | Remote Configuration                      | <input type="button" value="Yes"/>         |
| Boot X at Reset                                                                                                                                 | <input type="button" value="No"/>              | Configuration Server                      | <input type="text" value="192.43.153.16"/> |
| Config file access                                                                                                                              | <input type="button" value="TFTP"/>            | Secondary Font Server                     | <input type="text" value="192.43.153.24"/> |
| Primary Font access                                                                                                                             | <input type="button" value="NFS"/>             | System Hostname                           | <input type="text" value="ncdu60"/>        |
| Secondary Font access                                                                                                                           | <input type="button" value="TFTP"/>            | TCP/IP Access Control                     | <input type="button" value="Off"/>         |
|                                                                                                                                                 |                                                | NCDnet Access Control                     | <input type="button" value="Off"/>         |
| <input type="button" value="Load Previous Values"/> <input type="button" value="Protocol Parameters"/> <input type="button" value="Main Menu"/> |                                                |                                           |                                            |

After setting up the protocol parameters goto the main menu. Save PowerOn values and Reset Server. When the parameter setting is correct and the Server from which is booted is configured and running, the X-terminal will boot automatically.

| Protocol Parameters                                                                                                                                        |                                                |                       |                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------------|--------------------------------------------|
| <b>ICP/IP Parameters</b>                                                                                                                                   |                                                |                       |                                            |
| Determine Addresses                                                                                                                                        | <input type="button" value="From Network"/>    | Boot Server           | <input type="text" value="0.0.0.0"/>       |
| Which Interface                                                                                                                                            | <input type="button" value="Ethernet"/>        |                       |                                            |
| System's IP Address                                                                                                                                        | <input type="text" value="192.43.153.102"/>    | Subnet Mask           | <input type="text" value="FF.FF.FF.00"/>   |
| IP Routing Method                                                                                                                                          | <input type="button" value="Default Gateway"/> | Default Gateway       | <input type="text" value="0.0.0.0"/>       |
| Broadcast Address                                                                                                                                          | <input type="text" value="192.43.153.255"/>    |                       |                                            |
| Type of Name Service                                                                                                                                       | <input type="button" value="Domain"/>          |                       |                                            |
| Default Domain Suffix                                                                                                                                      | <input type="text" value="ncd.com"/>           |                       |                                            |
| Primary Name Server                                                                                                                                        | <input type="text" value="192.43.153.16"/>     | Secondary Name Server | <input type="text" value="192.43.153.24"/> |
| Default Telnet Host                                                                                                                                        | <input type="text" value="sheridan"/>          |                       |                                            |
| <b>NCDnet Parameters</b>                                                                                                                                   |                                                |                       |                                            |
| Which Interface                                                                                                                                            | <input type="button" value="None"/>            | Designated Router     | <input type="text" value="1.0"/>           |
| System's NCDnet Addr                                                                                                                                       | <input type="text" value="0.0"/>               | Default Cterm Host    | <input type="text" value="1.22"/>          |
| <b>LAI Parameters</b>                                                                                                                                      |                                                |                       |                                            |
| Circuit Timer (ms)                                                                                                                                         | <input type="text" value="80"/>                | Retransmission Limit  | <input type="text" value="8"/>             |
| Directory Size Limit                                                                                                                                       | 100                                            |                       |                                            |
| <div> <input type="button" value="Load Previous Values"/> <input type="button" value="Serial Parameters"/> <input type="button" value="Main Menu"/> </div> |                                                |                       |                                            |

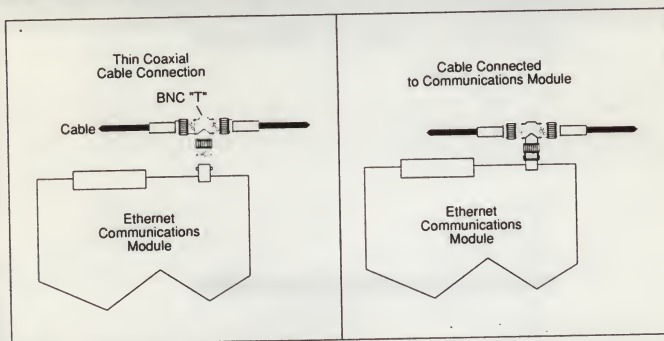
**NOTE:** For more detailed information on booting and setting up the X-terminal, see the with the X-terminal delivered documentation from NCD (NCD19 User's manual and NCDware 2.2 X Server User's Manual).



## 24.6.4 Installation

### 10BASE2 Ethernet installation:

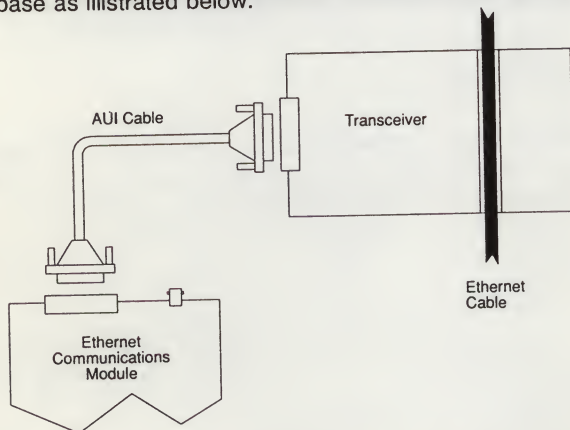
Connecting the NCD X-terminal to a 10BASE2 (thin cable) Ethernet network is accomplished with a BNC "T" connector as illustrated below.



**NOTE:** Make sure the **network button on the rear** of the display station base is pressed in, configuring the NCD X-terminal for 10BASE2 (thin) Ethernet.

### External Transceiver Cable Installation:

To connect the NCD X-terminal to a network other than 10BASE2 (thin) Ethernet, use an external transceiver and an Attachment Unit Interface (AUI) cable. Connect the AUI cable to the 15-pin connector labeled "TRANSCEIVER" on the back of the display station base as illustrated below.



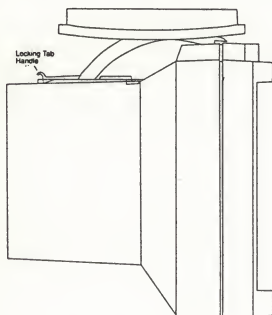
**NOTE:** Make sure the **network button on the rear** of the display station base is in its raised position, configuring the NCD X-terminal to communicate through a transceiver.



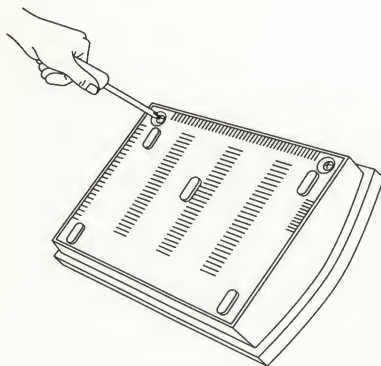
## Adding memory to the NCD19

To gain access to the NCD X-Terminal's main printed circuit assembly follow the following steps:

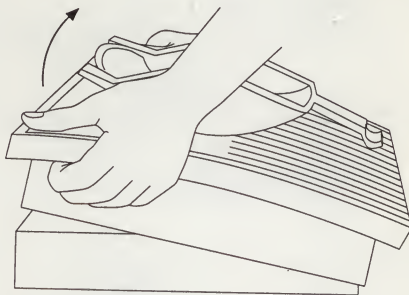
1. Remove all cables from the display monitor and the display station base.
2. Separate the display monitor and display station base as described below:
  - a. Turn the monitor and base upside down and rest them on a flat surface. **Never** lift an upside-down display station by its base.
  - b. Locate the monitor locking tab handle at the rear of the display station



- c. Lift up on the locking tab handle. The tabs should disengage. Press your fingers against the base while holding the locking tab handle up. Push the base back and away from the front of the monitor, then lift the base off the monitor.
3. Place the display station base upside-down on a flat surface.
4. When the display station base is upside-down, remove the two screws from the bottom of the base, as shown in the next figure. The screws are found near the front corners of the base.

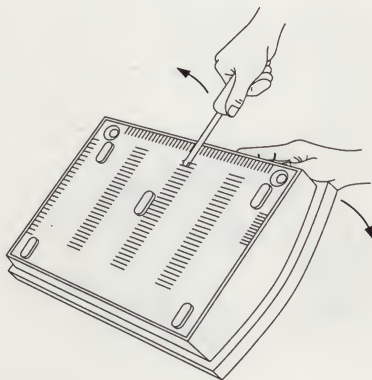


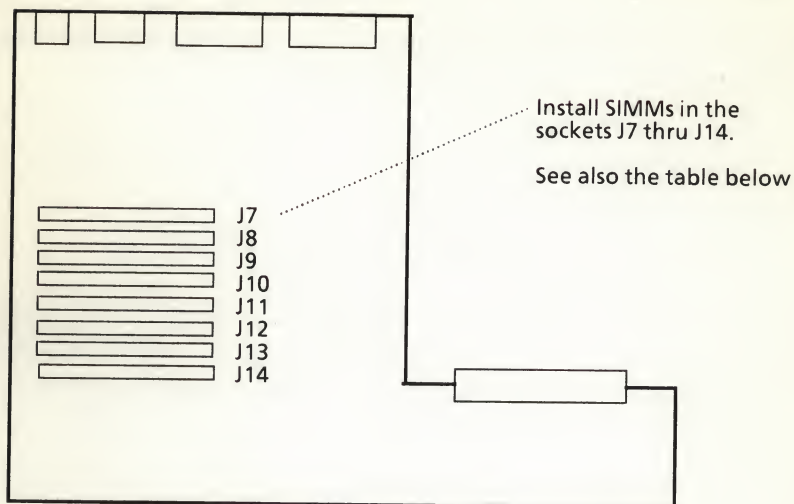
5. Lift the front edge of the base's bottom cover about a quarter of an inch (as shown in figure below), then pull the cover forward to release the plastic fingers at the rear of the base. If you have difficulty lifting the cover, insert the tip of a flat-blade screwdriver into the front center vent on the bottom of the base, and pull the base away from the cover.



#### Installing the SIMMs:

The NCD19 main printed-circuit assembly has eight slots for single in-line memory modules (SIMMs). The figure below shows the location of the SIMM sockets. The NCD19 may be configured with 2, 4, 5 or 8Mbytes of memory.



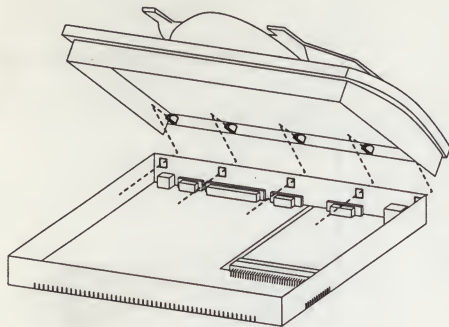


| Socket | 2 Mb   | 4 Mb | 5 Mb   | 8 Mb |
|--------|--------|------|--------|------|
| J6     | 256 Kb |      | 256 Kb | 1 Mb |
| J7     | 256 Kb | 1 Mb | 1 Mb   | 1 Mb |
| J8     | 256 Kb |      | 256 Kb | 1 Mb |
| J9     | 256 Kb | 1Mb  | 1 Mb   | 1 Mb |
| J10    | 256 Kb |      | 256 Kb | 1 Mb |
| J11    | 256 Kb | 1 Mb | 1 Mb   | 1 Mb |
| J12    | 256 Kb |      | 256 Kb | 1 Mb |
| J13    | 256 Kb | 1 Mb | 1 Mb   | 1 Mb |

### Closing the Display Station Base:

Once you have installed the SIMMs, close the display station base following the following steps:

1. Insert the tabs on the back edge of the cover into the slots at the back of the base, then gently lower the cover into place (see figure below).

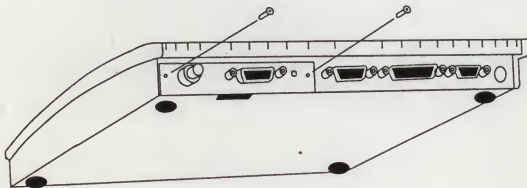


2. Secure the cover with the 2 screws you removed.
3. Turn the base right side up.
4. Connect all cables from the display monitor to the display monitor base unit, apply power and run the march test on all banks of installed RAM (see section 24.6.5).

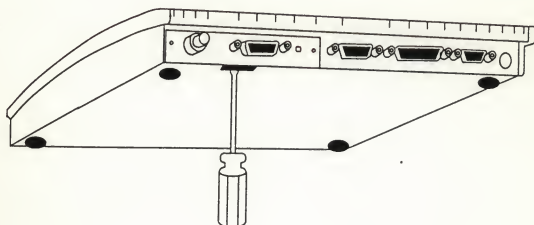
### Adding Server PROMs to a NCD X-terminal

If you have to install NCD X Server PROMs into the NCD X-terminal, follow the following steps:

1. Remove the 2 screws holding the communications interface in place in the display station base.



2. Place a flat-blade screwdriver in the slot at the bottom of the base and twist it to loosen the communications module.



3. Slide the communications module out of the base.
4. Install the PROMs in the sockets. The PROMs have to be labeled for the sockets in which they have to be installed. Make sure that the strap setting is corrects (see section 24.6.3).
5. Reinstall the communications module back into the displays station base.
6. Reconnect all wiring and power on the X-terminal. Press **<alt>** **<ctrl>** and **<setup>** at the same time. A prompt will appear in the left lower corner of the screen. Enter now **<bp>** **<CR>**. The boot cyclus should now start with the message "Server Code at .....", "Unpacking Code".

## 24.6.5 Maintenance

### Test and Diagnostics

The NCD X-Terminals are equipped with a PROM based debug/diagnostic utility. The X-terminals can be put into bug mode by entering; **<ctrl>**, **<alt>** and **<setup>** at the same time, a bug prompt will appear. When now a "?" is pressed, a list of possible commands will be displayed.



The most important commands (utilities) will be discussed below:

1. BT Boot from a remote host

**bt /tftpboot/Xncd19 [internet addr] [host internet addr]**

2. BP Boot from server PROM (can only be used when PROMs installed)

**bp**

3. EX Extended tests

**ex**

The following menu will appear:

| Test number | Test Type            |
|-------------|----------------------|
| 1.          | LANCE Test           |
| 2.          | Mouse Port           |
| 3.          | Aux. Port            |
| 4.          | Data Ripple          |
| 5.          | Address Ripple       |
| 6.          | RAM March            |
| 7.          | Video Linarity       |
| 8.          | Video Focus          |
| 9.          | Video Black Level    |
| A.          | Video Burnin Pattern |
| Q.          | Return to Monitor    |

Enter Test Type ?

### Running the RAM March Test:

This test is used to check memory, in case of a memory upgrade or memory failure.

- a. Select via the Extended tests (**ex**) test number 6 (RAM March)
- b. Enter the appropriate ending address value from the following table

| SIMM size<br>in Bytes | Bank 0 (J7, J9, J11, J13)<br>Ending Address | Bank 1 (J6, J8, J10, J12)<br>Ending Address |
|-----------------------|---------------------------------------------|---------------------------------------------|
| 256K                  | 8FFFFFF                                     | CFFFFFF                                     |
| 1M                    | BFFFFFF                                     | FFFFFFF                                     |

Run the test once by pressing the Return key when asked for a test choice. The diagnostic code will display either:

Pass - 00000001

to signify that the memory is good or a message similar to the following:

was A5A5A4A5 s/b A5A5A5A5 at 82C458 March test failure

If an error was detected. The first number is the data read by the test, the second is the data that the test expected to be, and the third is the memory address at which the discrepancy was detected.

- c. If an error was detected, note the address of the failure (82C458 in the example above). Counting the bytes from zero to three and from left to right, note the byte or bytes in the test data that differ from the expected data (byte two in the example).
- d. Using the table below, look up the first digit of the address at which the failure occurred and the byte that failed. The corresponding table entry gives the location of the failing SIMM.

| Byte | 802000 to<br>BFFFFF | C00000 to<br>FFFFFF |
|------|---------------------|---------------------|
| 0    | J13                 | J12                 |
| 1    | J11                 | J10                 |
| 2    | J9                  | J8                  |
| 3    | J7                  | J6                  |

In the example above, the table entry reveals that the SIMM in J9 is failing.

- e. Replace the failing SIMMs or remove the entire bank of SIMMs containing the failing SIMM, then rerun the memory test.
- f. If you entered the Boot Monitor by pressing <Esc> twice and the test passed, you can reset the terminal by typing **rs** at the Boot Monitor prompt and pressing <return>.
- g. If you entered the Boot Monitor prompt by setting "Boot X at Reset" to No, you need to reboot the terminal using one of the b commands (bt or bp).

